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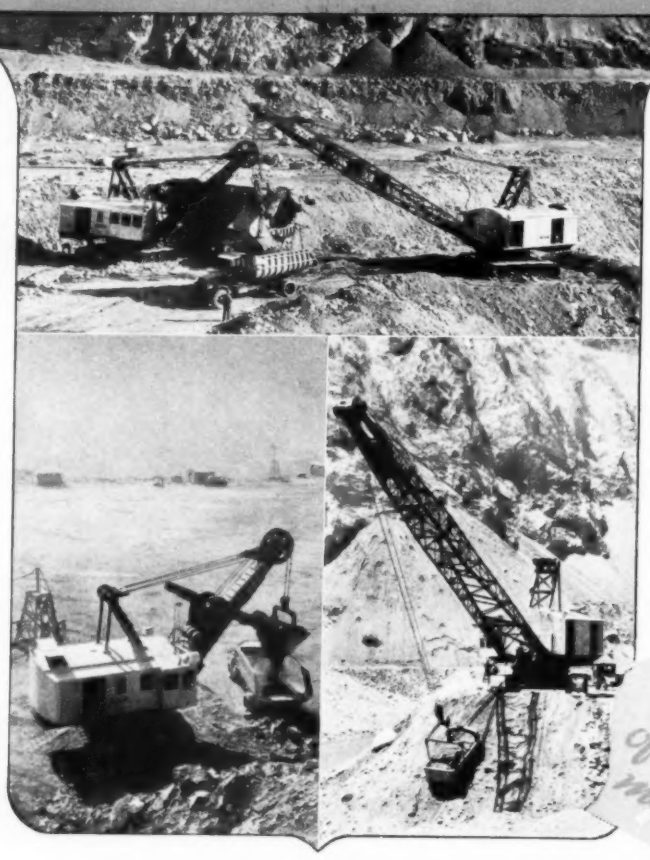
Vol. XXIX JANUARY 1935 Number 1

EXCAVATING ENGINEER

FOUNDED 1905

A dangerous grade and a sharp curve are eliminated by this reroute near Bedford, Indiana. Calumet Paving Company, Inc. of Gary use this Caterpillar-powered Bucyrus-Erie 34-B Diesel to load to Athey wagons behind Caterpillar tractors.

ANNOUNCING
... a new 120-B



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Owners who knew the 120-B at first hand said it couldn't be done . . . that this famous 4-yard shovel had everything . . . couldn't be improved on. But there was a need in the quarry and mining field for lower costs. Bucyrus-Erie set to work to fill that need with more speed, larger output, greater flexibility . . . retaining all the simplicity and strength of the famous machine that put the railroad shovel out of business. Now this new 120-B is ready to go out on your job . . . completely modernized . . . with a faster cycle . . . even greater power at the dipper teeth . . . improved balance of weight and strength . . . ready convertibility that permits quick and convenient field change to dragline or shovel. Send for complete data on this new 1935 model 120-B.

871

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There is nothing that can tie up the job and cause greater loss of time and money than unexpected wire rope failure. Be sure of your wire rope—Be sure it's Hercules (Red Strand) and your jobs will go ahead at top speed without loss of time.

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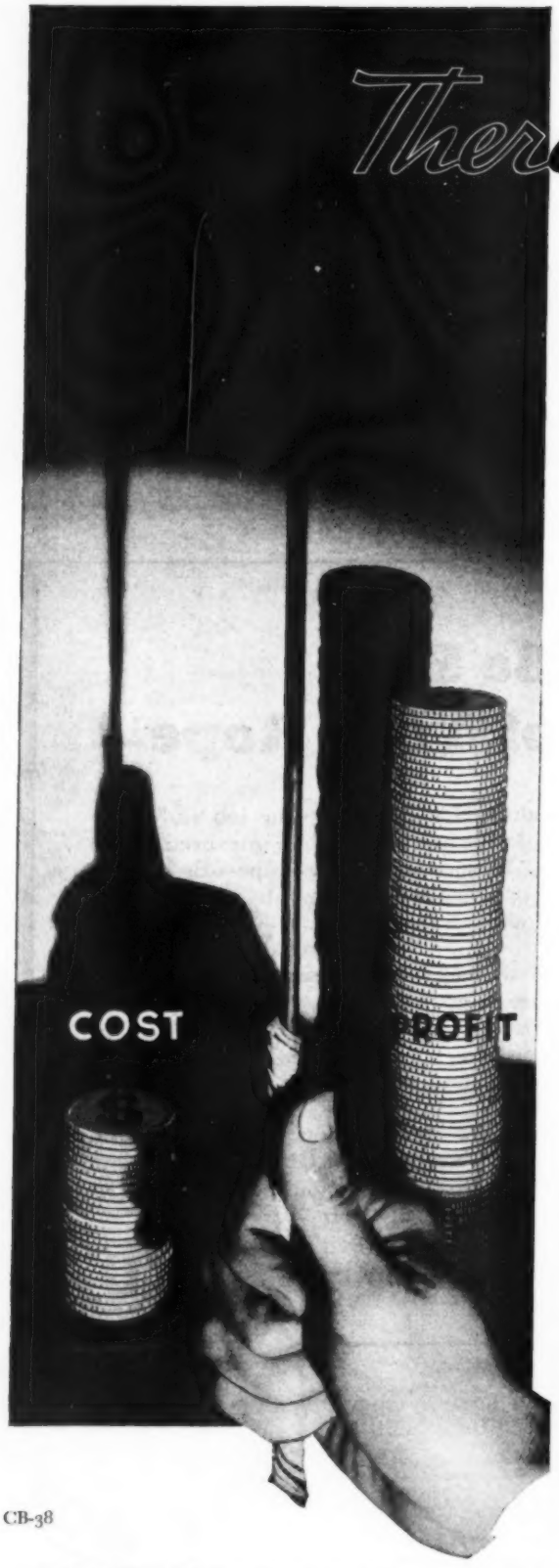

CB-38

There's more on the RIGHT SIDE

Let's look at both sides of the Cordeau question.

Cordeau-Bickford is an insensitive *detonating* fuse. It consists of a lead tube filled with trinitrotoluene (TNT), which when detonated with a fuse cap or E. B. Cap carries a powerful detonating wave to all parts of the blast. This wave travels at a speed of approximately 3 miles per second.

Like any equipment, the profit-making power of Cordeau is in what it may save you — in time, labor, hazard. If you can use giant blasts, for instance, there should be no question about the benefits of Cordeau: they outweigh first costs to such an extent that the Cordeau-detonated giant blast is rapidly becoming standard practice wherever possible.

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We don't wish to over-sell you, but we do suggest that you look into this subject. Others have found the use of Cordeau very profitable. Send for the Cordeau book. The Ensign-Bickford Co., Simsbury, Conn. *Estab. 1836.*

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ALSO SAFETY FUSE *Since* 1836

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EXCAVATING ENGINEER

DEVOTED EXCLUSIVELY
TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 29 JANUARY, 1935 No. 1

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Looking Ahead

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New Breakwater Saves City

Jesse A. Howland & Sons, Inc., construct two seawalls at Ocean City, Maryland, to stop erosion caused by ocean waves.

Building San Gabriel Dam No. 1.

The construction of this huge rock fill dam presents many interesting features. West Slope Construction Company is the contractor on this $8,000,000 project.

Merritt Parkway Construction Embodies Unusual Features

Peter Mitchell, Inc., is working on the largest road excavating project ever undertaken by the State of Connecticut.

Published Monthly by THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

Regular subscription: 25 cents per copy, $1.00 a year; Canada and foreign, $2.00 per year. Special subscription: Upon application on card inserted in this number, this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

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...*because of* RED ARCH *Design and Construction*

EVERY dragline user should know about the new Red Arch buckets. They are tough babies . . . built to take a lot of punishment. They're light in weight . . . excess weight is eliminated because poundage saved means yardage gained on every pass. They fill quickly . . . dump freely and cleanly. Their flexible rope hitches prolong life . . . the dump sheave is well guarded . . . the padlock is in one piece. You'll like the way they balance . . . the way they carry their big loads with a minimum of wear on clutches and brakes. Lips are extra strong, bottoms are reinforced, teeth are removable for sharpening or replacement, and the famous Red Arch holds its shape and keeps the bucket rigid through an astonishing amount of digging.

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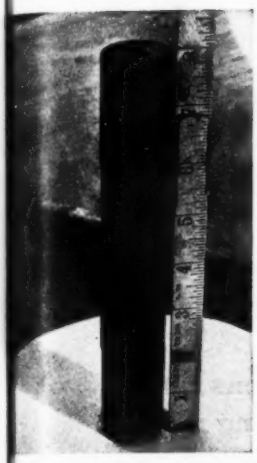
eal News For Coal Miners!



ORM PELLETS. 4 uniform to 8-in. cartridge permit te charges and better g control.

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OFFERS ADVANTAGES in Economy and Reduced Fumes and Smoke

SHINING, BRIGHT COAL—the kind that sells—not dull or discolored—that's what Hercules Pellet "D" produces.

is real news for miners. In Hercules t "D", the smoke and s usually associated black powder have reduced amazingly.

only that, but Pel- "D" has the down- economy and lump- ing action that rs want.

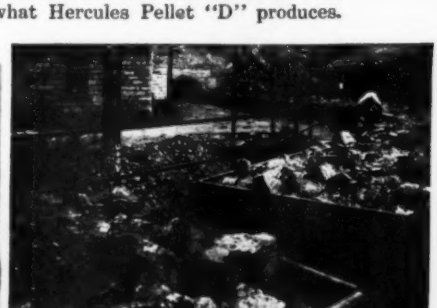
is black powder at est. In convenient s, with a count of ximately 125 1¼ in. . cartridges to a 50- ox, it has the abil- shoot coal as you it shot.

t "D" proved its hin hundreds of tests rious parts of the ry before it was in- ced. Now, although powder, it is rapid- nning favor in dis- where it has been tried. Operators like it for the way it speeds up production and increases tonnage. Miners are enthusiastic about the way Pellet "D" cuts down fumes and smoke and lets them get back to the face with less delay.

Hercules Pellet "D" is a new tool for today's needs. Hercules dealers everywhere will tell you more about it.

HERCULES POWDER COMPANY
INCORPORATED
972 King St., Wilmington, Delaware

"MINERS LIKE IT," says George K. Anderson, Hercules service man in West Virginia. "They won't take anything else because of good results and reduced fumes and smoke."



LUMP THAT STAYS LUMP. Firm chunks, clean and solid, that break less in handling, come from Hercules Pellet "D" because it doesn't grind or "go through" the coal.

B-10

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THE ability of an electric shovel to "SEE IT THROUGH" is what WINS and HOLDS confidence. You buy on the basis of PROVED PERFORMANCE.

The performance records of shovels equipped by General Electric have not only won, but have held, the confidence of the users—have backed up their judgment in buying them.

Why are these records so outstanding? One of the reasons is that General Electric has continuously co-operated with leading manufacturers for more than 30 years. This exchange of sound engineering ideas has resulted in equipment that is electrically and mechanically fit, that is economically RIGHT for the service, that represents the CORRECT answer to the practical problems involved.

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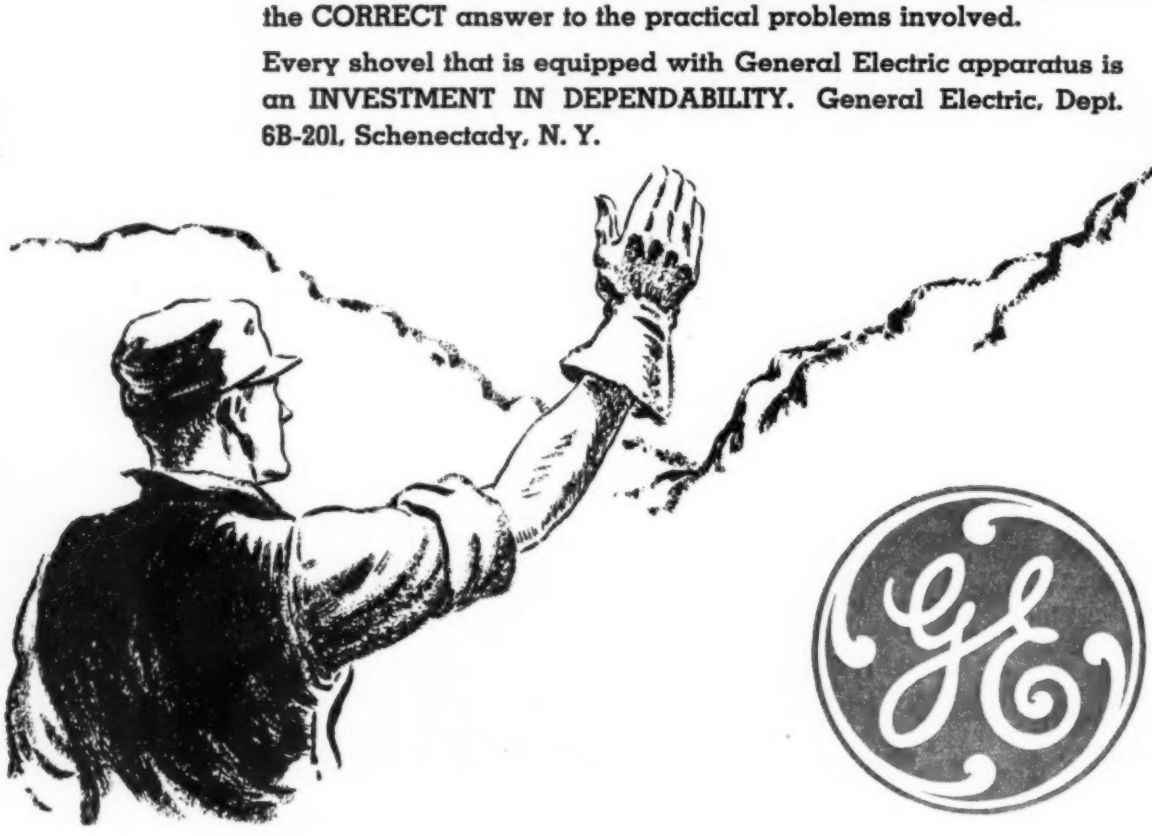

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that Wins *and holds* Confidence

G-E Equipment on the Job

G-E equipment — dependable electric servants that stay on the job day and night — asking little for upkeep — getting the most out of the construction apparatus — guarding men, machinery, and profits.

The field experience of G-E engineers in applying electric power to all types of construction equipment; the alertness and proximity of G-E service; the dependability of G-E apparatus — these are incomparable aids to the enterprising builder.

See General Electric for all types of electric equipment for construction machinery — motors, control, motor-generator sets, portable substations, wire and cable, insulators, transformers, cutouts, locomotives, battery-charging equipment, floodlights, and air heaters.

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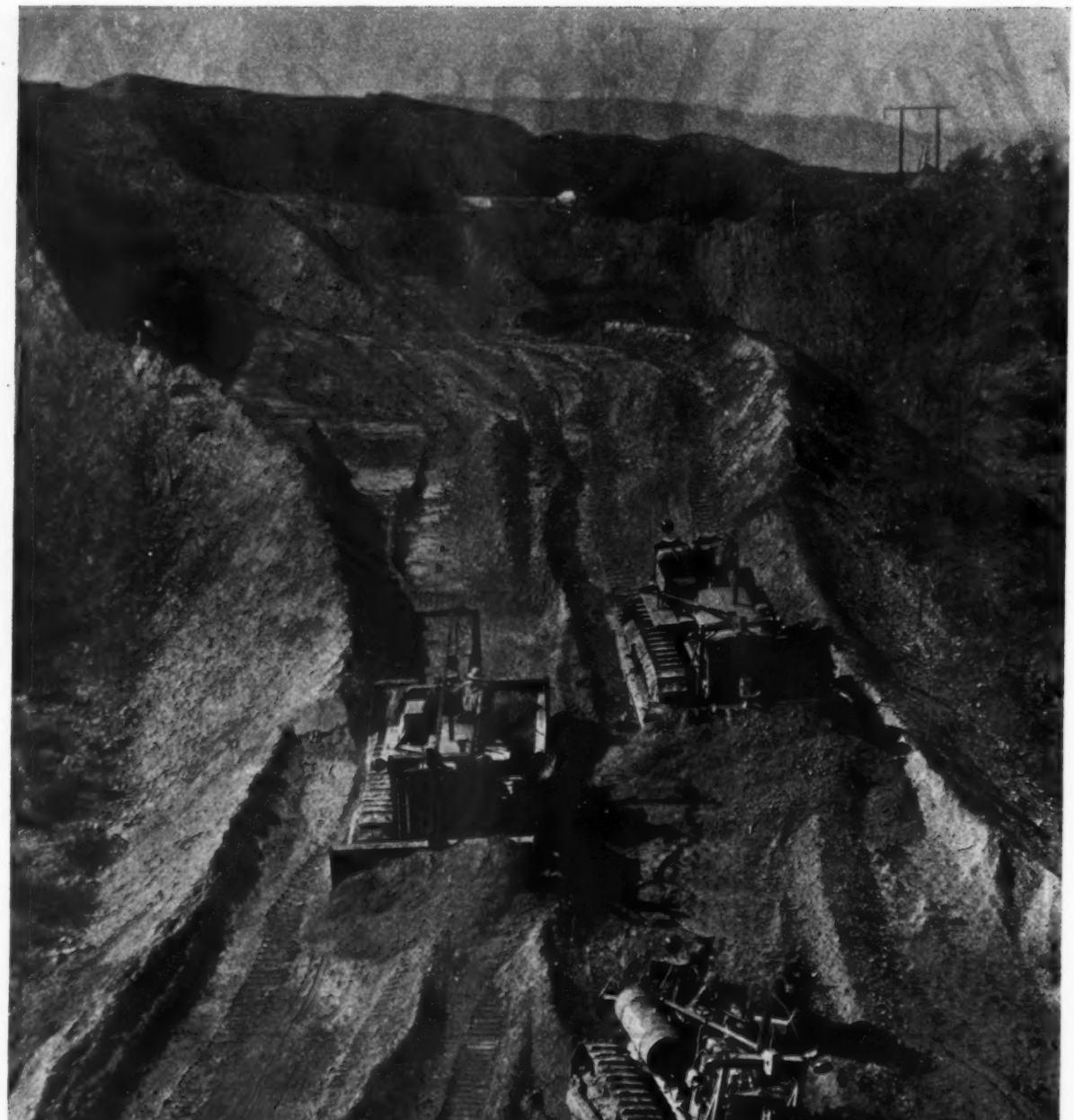


● *The new Jack Rabbit Trail in California will shorten the existing highway from Riverside to Palm Springs and the Imperial Valley by 5 miles. This Crow Bros. job in Riverside County had some easy dirt moving in this fill where Caterpillar Diesels and Le Tourneau dirt movers are doing their stuff.*

EXCAVATING ENGINEER
FOUNDED 1905

JANUARY 1935
VOL. XXIX NO. 1

● *Secondary and rural roads are receiving increased attention in present day highway plans. Here, contractor Paul E. Barry is "making the dirt fly" on a job near Richland, Penn.*

Excavation for 1935 Highway Construction

Federal Aid continues to play large part in financing of work . . . Diversion of revenues apt to decrease due to provisions of Hayden-Cartwright Act . . . Volume of work carried over still large . . . Amount of work programmed slightly under last year . . . Efforts to stop diversion of gas tax continued.

WHILE 1934 may turn out to be a banner year for total volume of road construction, 1935 has a chance to equal it, in dollar volume, providing the various states, now diverting to other uses funds received from the gas tax, enact legislation against this practice. Beginning this year, Federal funds have to be matched by the recipients, therefore such legislation may be necessary in order to obtain the full apportionment authorized.

In general, many states in this complete forecast of 1935 highway construction report decreases ranging from 5 to 40 percent. The Federal allotment decreases from the $200,000,000 outright grant of last year to $125,000,000 for this year which must be matched dollar for dollar.

Meanwhile PWA continues to help the construction industry, not alone by road work, but by construction of all kinds. At the beginning of this year PWA has 7,600 projects under construction and 2,800 more which received allotments and which will get under way before long. PWA has now spent slightly over $2,000,000,000, only a little over half of the $3,700,000,000 appropriated by Congress.

With all the road building that has been done during the past years, there still remain miles upon miles of unimproved roads. The American Road Builders' Association reports over 2,000,000 miles of mud roads yet to be improved. In addition 60,000 miles of trunk highways are highways in name only, entirely unfit to meet the traffic requirements of today and tomorrow.

International highways and transcontinental super highways are needed and are being considered by the Federal Government in its efforts to create employment. It is entirely possible that Congress, meeting this month,

● *Bulldozing a road through the forests. Clarence Young of Oakland, California with his Caterpillar Diesel Seventy-five and Le Tourneau bulldozer is constructing this road near Butte Meadows, California.*

will authorize additional appropriations to carry out these projects and that they will be started this year.

C. M. Upham, Engineer Director, of the American Road Builders' Association is of the opinion that there will be less road construction during 1935 than in 1934.

"In making a forecast of highway expenditures for 1935," writes Mr. Upham, "there are so many legislative uncertainties involved that figures submitted are unsatisfactory at best. However the following estimate may be of interest.

"On January 1, 1934 there was $238,000,000 of the 1933 Federal emergency highway appropriation available for 1934 construction. This included unobligated funds and projects approved but not awarded. In addition there was expended in 1934 $65,000,000 of the $200,000,000 authorized by the Hayden-Cartwright Act of June, 1934. This makes the total Federal highway construction contribution for 1934 $303,000,000. In addition the States are estimated to have contributed about $225,000,000, which makes a total state highway construction program of $528,000,000 for 1934.

"Maintenance figures for 1933 amounted to $138,000,000. Assuming maintenance expenditures to be slightly more for 1934, or $140,000,000, the grand total for the year would be $668,000,000.

"On January 1, 1935 there will be about $110,000,000 of Federal emergency funds available for new projects and about $25,000,000 additional for projects approved but not awarded. To this may be added $125,000,000 of regular Federal Aid available July 1, 1935, making a total of $260,000,000 Federal funds for the highway construction program in 1935. State funds should again amount to about $225,000,000, if no more funds are diverted, making a total of $485,000,000 available for 1935 state highway construction. Adding maintenance figures assumed to be about the same as for 1934, $140,000,000, this would make a total state highway construction and maintenance program of $625,000,000 for 1935.

"The summary: (millions omitted)

	Const.	Maint.	Total
1932	$551	$169	$720
1933	452	138	590
1934	528	140*	668
1935	485	140*	625

*Estimated.

"The expenditures by state highway departments for equipment were as follows:

1930	$22,300,000
1931	21,500,000
1932	22,100,000
1933	17,900,000

"The 1934 figures are not yet available. Equipment expenditures decreased in 1933 along with maintenance expenditures which were $31,000,000 less than 1932. The necessity for replacement of worn out and obsolete equipment should result in an upward trend in equipment expenditures for 1934 and 1935.

President Roosevelt in his message to Congress January 4, said, " . . . It is a duty dictated by every intelligent consideration of national policy to ask you to make it possible for the United States to give employment to all of these 3,500,000 employable people now on relief, pending their absorption in a rising tide of private employment. . . .

" . . . This work will cover a wide field, including clearance of slums, which for adequate reasons cannot be undertaken by private capital; in rural housing of several kinds where, again, private capital is unable to function; in rural electrification; in the reforestation of the great watersheds of the nation; in an intensified program to prevent soil erosion and to reclaim blighted areas; in improving existing road systems and in constructing national highways designed to handle modern traffic; in the elimination of grade crossings; in the extension and enlargement of the successful work of the civil conservation corps; in non-federal work, mostly self-liquidating and highly useful to local divisions of government; and on many others which the nation needs and cannot afford to neglect."

● *On a road building job near Martinsburg, West Virginia, this Euclid "Trac-Truk" moves dirt and rock economically.*

"Practically all of the money appropriated for the construction of roads on Federal public lands other than forests was obligated during the year to projects in the states containing these lands.

"While the provisions of the Hayden-Cartwright Act, make it unlikely that there will be any **further** diversion of road funds by the 44 state legislatures meeting in 1935, there is still the problem of stopping the present diversion of huge sums from highway funds.

"With the probability of further legislation by Congress favoring highway construction, and considering that pressure is being brought on the state legislatures to find other means of balancing budgets than the use of road funds, the prospects for increased activity in highway construction during 1935 may later reverse the downward trend shown by the above estimate."

$125,000,000 Federal Aid Apportioned for 1935-36 Fiscal Year

State	Sum Apportioned
Alabama	$2,604,320
Arizona	1,781,347
Arkansas	2,142,723
California	4,756,959
Colorado	2,288,811
Connecticut	791,253
Delaware	609,375
Florida	1,655,723
Georgia	3,168,221
Idaho	1,531,162
Illinois	5,160,696
Indiana	3,087,613
Iowa	3,231,718
Kansas	3,317,054
Kentucky	2,304,143
Louisiana	1,776,939
Maine	1,090,167
Maryland	1,025,870
Massachusetts	1,741,877
Michigan	3,837,292
Minnesota	3,423,306
Mississippi	2,196,524
Missouri	3,800,856
Montana	2,560,449
Nebraska	2,581,663
Nevada	1,595,501
New Hampshire	609,375
New Jersey	1,675,751
New Mexico	1,999,299
New York	6,150,106
North Carolina	2,938,657
North Dakota	1,960,162
Ohio	4,565,435
Oklahoma	2,947,521
Oregon	2,044,633
Pennsylvania	5,348,062
Rhode Island	609,375
South Carolina	1,692,896
South Dakota	2,036,775
Tennessee	2,638,159
Texas	7,777,504
Utah	1,410,752
Vermont	609,375
Virginia	2,278,475
Washington	1,949,957
West Virginia	1,356,793
Wisconsin	3,045,557
Wyoming	1,559,444

Forecasts by States

Alabama

According to L. G. Smith, Director, Alabama, in 1935, expects to have available $5,850,000 for new construction, $2,500,000 for maintenance, and $3,000,000 for other purposes such as right-of-way purchases, engineering, etc. This means a total expenditure of $11,350,000 as compared with $13,925,000 last year, a reduction of approximately 20%.

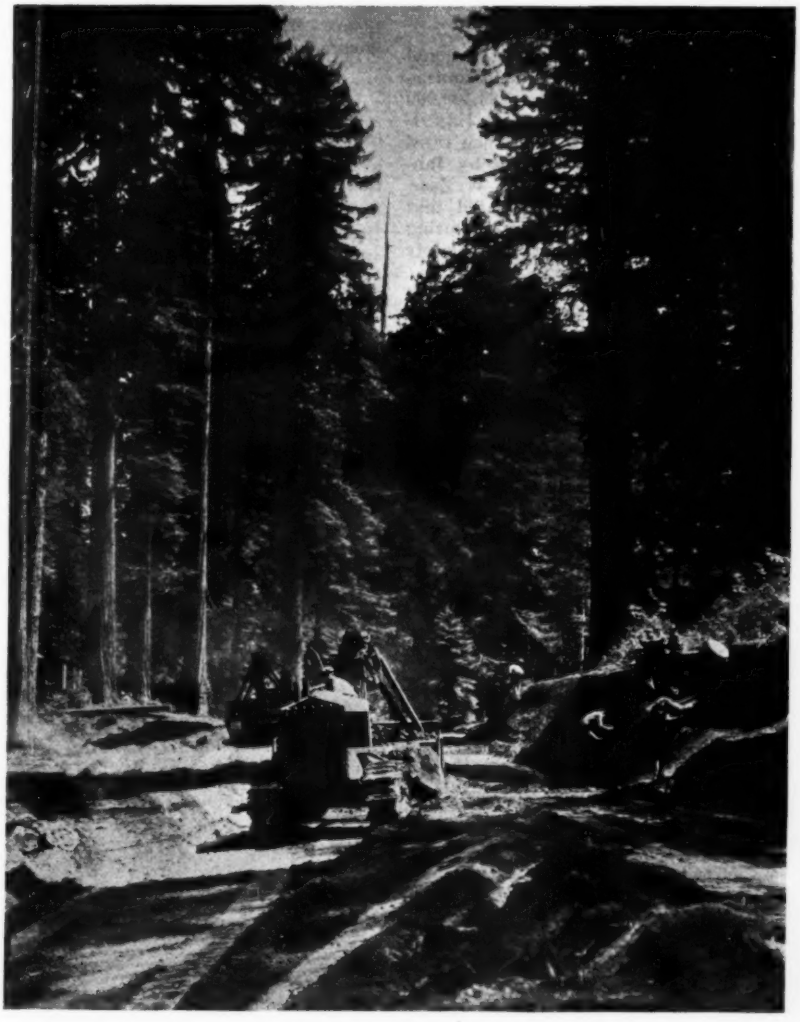
1935 funds will come from the Federal appropriation under the Hayden-Cartwright bill signed last June amounting to $4,250,000, $4,600,000 from the state gas tax, and $2,500,000 from other sources.

The tentative program for 1935 construction includes $1,045,000 for grading 70 miles of new roads, involving 840,000 yards of excavation; $210,000 for 29 miles of graveled or stone-surfaced roads, with 248,000 yards of excavation; $1,447,000 for 57 miles of high-type pavement, with 684,000 yards of excavation; and $1,164,000 for 97 miles of low-type pavement with 1,164,000 yards of excavation. Culverts and small bridges are included in the figures above.

Hold-over work contracted in 1934 or previously, and carried over into 1935 will involve approximately 950,000 yards of excavation involving an expenditure of $285,000.

Arizona

H. C. Hatcher, Statistical Engineer, wires that a rough estimate of Arizona's 1935 road construction program calls for oil surfacing 150 miles for $1,250,000; paving 25 miles for $500,000; grading, draining and gravel surfacing 200 miles for $3,750,000; bridges



● *Beautiful scenery makes an attractive setting for this road construction by Youdall Construction Company of San Francisco. The work is near Crescent City, California, and two Cletrac 80's equipped with Le Tourneau bulldozers are shown.*

● *In 1934 approximately one-fifth of highway revenues were used for maintenance. Illustrated is an excellent piece of California grade which is kept in shape by a rubber-tired Baker road disc pulled by a Cletrac 25 followed by an Austin Western patrol.*

for $200,000 and grade separation for $300,000.

Federal funds allotted under the Hayden-Cartwright Act were $2,641,935 for the 1934-35 fiscal year. For the fiscal year beginning July 1, 1935, the allotment will be $1,781,347.

Arkansas

Under the provisions of the National Recovery Act, the State of Arkansas was allocated approximately $3,400,000 for the period subsequent to July 1, 1934. Of this amount, about one third will be placed under contract by January 1, 1935. According to W. W. Zass, Chief Engineer, it is anticipated that the balance will be committed during the 60 to 90-day period immediately following January 1.

The state will have no funds available for new construction for the 1935 calendar year.

The program covering the Federal funds includes the following anticipated work: 41 miles of Portland cement concrete pavement; 8 miles of high-type asphalt pavement; 34 miles of medium-type asphalt pavement; 37 miles of base courses for asphaltic types; 121 miles of gravel surfacing; 145 miles graded and drained; 3,182 lineal feet of bridge structures, all types; 8 railroad grade crossings eliminated by relocation; and 2 grade crossings eliminated by structures.

California

California's highway construction program is established upon the basis of a biennial budget which is subject to the approval of the State Legislature. The biennium covered by the next budget will include the period from July 1, 1935 to June 30, 1937.

At the moment, this budget is in the preparatory stage, prior to its submission to the State Legislature, which convenes on January 7, 1935. However, the construction budget as it will be presented to the Legislature will amount to approximately $36,000,000 for the two years from July 1, 1935 to June 30, 1937. This figure includes some $27,000,000 in state funds and estimated Federal aid of about $9,000,000 for this two year period.

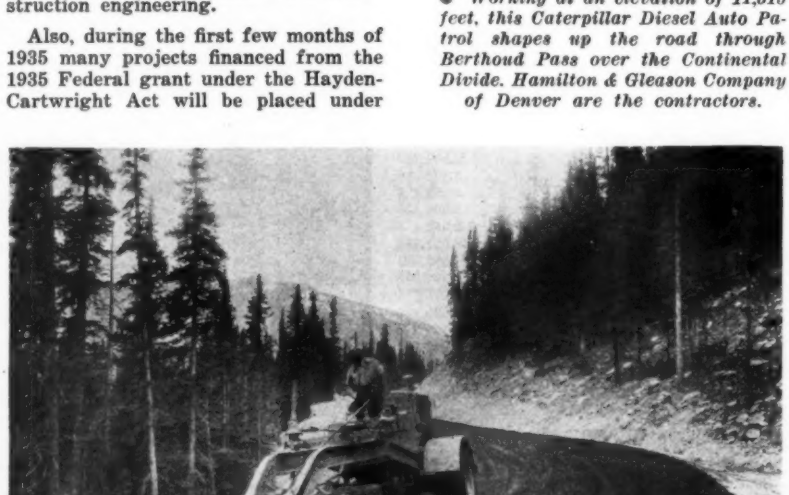
In the budget the total allocations for major construction projects, betterment, minor improvement and joint highway district projects amount to about $27,000,000 and the remainder is covered by allocations for right-of-way, preliminary engineering, and construction engineering.

Federal Aid funds paid to States during the fiscal year 1934 amounted to $42,291,937 and emergency construction funds similarly paid amounted to $55,669,145. Public works highway funds assigned to the various States amounted to $394,000,000.

Also, during the first few months of 1935 many projects financed from the 1935 Federal grant under the Hayden-Cartwright Act will be placed under contract. California's share of this Federal money amounted to $7,932,206. Of this amount, eighteen projects totaling over $2,000,000 have been contracted for, or are now advertised for bids. It is anticipated that by January 1, 1935, nearly one-half of this Federal program will have been advertised. The remainder will be placed early in the year, so that there will be no delay in completing the program covered by the regular biennial budget, as soon as the approval of the Legislature is obtained.

As a gauge of California's progress in advancing her State highway construction program, it is noted that since January 1, 1934, major projects amounting to $15,621,500 have been started or are advertised. These projects included all types of construction; the following summary showing the mileage of various types and the amount expended for each type: 144.4 miles of pavement for $7,249,900; 91 miles bituminous-treated crushed rock surface for $1,989,700; 18.5 miles untreated crushed rock surface for $438,500; 71.8 miles graded roadbed for $1,861,000; 62 bridges and grade separations for $3,221,600; 1,699.5 miles of oil treated shoulders and roadbed for $665,800; and miscellaneous work costing $195,000; in all a grand total of 2,087.2 miles of work at a cost of $15,621,500.

● *Working at an elevation of 11,315 feet, this Caterpillar Diesel Auto Patrol shapes up the road through Berthoud Pass over the Continental Divide. Hamilton & Gleason Company of Denver are the contractors.*



● *There is tough digging in this bank on a Peter Mitchell job in Connecticut. One of Mr. Mitchell's Bucyrus-Erie 1½-yard shovels loads the rock into White trucks.*

Colorado

While the Highway Advisory Board has presented a tentative budget of the 1935 road program to the Governor, no forecast can be made until he signs and releases it. Excavating Engineer hopes to present it in the February issue.

Last year Colorado spent about $9,000,000 on road construction projects. It is expected that 1935 expenditures will run about the same.

Under terms of the Hayden-Cartwright Act Colorado received $3,486,000 for the 1934-35 fiscal year and will

Bureau of Public Roads Reports Status of Public Works Highway Program

as provided by the Acts of June 16, 1933 and June 18, 1934 as of December 15, 1934. **See also Page 14.**

State	Balance Available For New Projects	Approved, Contracts Not Yet Awarded				Contracts Awarded, Not Yet Under Construction			
		Number of Projects	Estimated Total Cost	Public Works Highway Funds	Miles	Number of Projects	Estimated Total Cost	Public Works Highway Funds	Miles
Alabama	$ 3,391,000	20	$ 969,000	$ 863,000	49.3	5	$ 274,000	$ 274,000	18.7
Arizona	1,802,000	4	214,000	199,000	9.4	1	3,000	3,000	
Arkansas	2,699,000	12	588,000	585,000	29.9	11	596,000	525,000	14.9
California	6,026,000	8	890,000	820,000	21.6	3	106,000	98,000	5.4
Colorado	946,000	5	513,000	512,000	23.6	2	47,000	47,000	1.1
Connecticut	537,000	1	156,000	156,000	1.2	3	13,000	13,000	
Delaware	251,000	1	5,000	5,000					
District of Columbia	249,000	1	69,000	69,000	0.4	2	243,000	243,000	1.4
Florida	1,678,000	7	334,000	334,000	17.6	5	176,000	176,000	7.7
Georgia	4,500,000	33	1,732,000	1,694,000	65.7	12	714,000	714,000	16.6
Hawaii	961,000					1	159,000	66,000	0.7
Idaho	1,346,000	2	17,000	17,000	1.6	2	118,000	118,000	13.0
Illinois	5,921,000	26	1,663,000	1,663,000	49.0	17	1,077,000	1,077,000	37.4
Indiana	4,856,000	13	890,000	841,000	29.0	9	252,000	252,000	11.0
Iowa	2,200,000	11	323,000	287,000	63.9	42	1,060,000	1,007,000	108.2
Kansas	2,142,000	14	234,000	234,000	5.1	37	880,000	880,000	96.2
Kentucky	2,578,000	5	191,000	153,000	7.4	30	737,000	654,000	65.6
Louisiana	2,663,000	10	260,000	258,000	5.2	9	255,000	255,000	1.7
Maine	576,000	4	154,000	144,000	1.3	4	218,000	210,000	7.4
Maryland	1,962,000	4	239,000	239,000	9.2	3	63,000	63,000	0.8
Massachusetts	2,618,000	2	399,000	399,000	1.7				
Michigan	3,261,000	15	759,000	759,000	32.3	9	618,000	603,000	10.0
Minnesota	2,619,000	20	514,000	510,000	87.3	22	365,000	335,000	47.7
Mississippi	3,293,000	21	747,000	675,000	29.7	9	255,000	226,000	16.0
Missouri	3,478,000	30	981,000	981,000	56.4	22	832,000	831,000	77.2
Montana	1,452,000	2	62,000	56,000	5.0	14	645,000	640,000	49.2
Nebraska	1,838,000	2	38,000	38,000	0.6	23	470,000	457,000	78.2
Nevada	1,336,000					16	297,000	247,000	58.6
New Hampshire	254,000	5	140,000	138,000	4.7	1	17,000	17,000	0.6
New Jersey	2,820,000	3	622,000	402,000	4.3	5	250,000	202,000	2.5
New Mexico	1,343,000	4	288,000	288,000	24.8	1	60,000	60,000	1.7
New York	3,138,000	17	1,204,000	1,021,000	44.4	40	2,618,000	2,146,000	89.2
North Carolina	3,986,000	21	1,002,000	655,000	59.3	18	514,000	429,000	23.9
North Dakota	2,350,000	21	426,000	351,000	111.8	41	649,000	575,000	159.0
Ohio	4,414,000	26	1,700,000	1,650,000	31.5	25	1,109,000	1,101,000	42.6
Oklahoma	3,012,000	13	1,081,000	866,000	20.1	21	1,315,000	1,236,000	64.4
Oregon	1,225,000	16	409,000	399,000	26.4	10	216,000	194,000	12.7
Pennsylvania	3,058,000	23	1,688,000	1,618,000	31.0	37	1,938,000	1,803,000	42.3
Rhode Island	538,000	4	336,000	336,000	5.1				
South Carolina	2,065,000	14	440,000	411,000	31.4	12	326,000	326,000	43.6
South Dakota	2,419,000	23	893,000	893,000	124.7	6	59,000	59,000	36.4
Tennessee	2,922,000	16	538,000	538,000	16.5	15	651,000	651,000	21.0
Texas	8,967,000	14	1,532,000	1,392,000	103.7	27	2,292,000	2,196,000	153.3
Utah	865,000	1	199,000	151,000	9.2	5	294,000	244,000	9.0
Vermont	403,000	6	107,000	95,000	4.9	3	61,000	61,000	4.1
Virginia	2,596,000	38	1,160,000	1,118,000	46.7	16	206,000	183,000	3.4
Washington	1,116,000	14	1,016,000	841,000	21.3	16	370,000	370,000	29.6
West Virginia	1,655,000	1	28,000	28,000		5	245,000	239,000	7.5
Wisconsin	3,901,000	1	19,000	14,000	0.9	13	730,000	619,000	23.3
Wyoming	739,000	9	387,000	387,000	84.7	7	256,000	256,000	43.5
Totals	$120,965,000	563	$28,156,000	$26,083,000	1,410.8	637	$24,649,000	$22,981,000	1,558.3

receive $2,288,811 (to be matched), for the fiscal year starting July 1, 1935. As of December 15, 1934 Colorado had available $946,000 for new projects.

Connecticut

The State Highway Department expects to have available for highways in 1935 approximately $17,500,000, a 6% increase over 1934. Of this amount, $12,500,000 will be for construction, $3,000,000 for maintenance, and $2,000,000 for other purposes, according to C. G. Nichols, Executive Deputy Commissioner. $200,000 of these funds are expected to come from Federal aid, $2,300,000 from Emergency Federal Relief, $5,000,000 from state gas tax, and $10,000,000 from other sources—including an estimated $2,000,000 from PWA funds. These figures are approximate, and depend on action taken by the State Legislature which convenes in January.

● *D. Arrigoni of Middletown used Linn tractors to haul from one of his Bucyrus-Erie steamers on this road job near East Hampton, Conn.*

Delaware

The amount of money which will be available for highway construction in Delaware is expected to be approximately $2,200,000, although the figure is problematical as this is a legislative year. Sources of income, according to Samuel Knopf, Principal Assistant Engineer, will be: state gas tax $1,100,000; motor license fees, etc. $900,000; and Federal aid $625,000.

Bureau of Public Roads Reports Status of Public Works Highway Program

as provided by the Acts of June 16, 1933 and June 18, 1934 as of December 15, 1934. **See also Page 13.**

STATES	WORK UNDER CONSTRUCTION				WORK COMPLETED				
	Number of Projects	Estimated Total Cost	Public Works Highway Funds	Miles	Number Employed	Number of Projects	Estimated Total Cost	Public Works Highway Funds	Miles
Alabama	116	$ 5,635,000	$ 4,493,000	335.4	5,709	82	$ 5,571,000	$ 3,609,000	275.9
Arizona	16	1,094,000	1,053,000	64.1	471	71	5,404,000	4,798,000	344.8
Arkansas	60	3,112,000	2,909,000	135.9	3,171	126	3,946,000	3,459,000	243.5
California	36	7,645,000	5,589,000	153.5	2,487	121	13,736,000	11,007,000	411.9
Colorado	40	2,600,000	2,128,000	244.4	1,597	145	6,951,000	6,728,000	364.5
Connecticut	11	2,437,000	2,247,000	44.6	851	15	1,372,000	1,368,000	20.9
Delaware	24	1,016,000	944,000	61.9	1,442	27	1,553,000	1,543,000	50.6
District of Columbia	6	422,000	422,000	2.6	1,285	23	1,908,000	1,908,000	14.5
Florida	19	1,796,000	1,673,000	41.3	1,122	68	5,002,000	4,032,000	188.6
Georgia	73	3,433,000	3,289,000	182.1	3,954	142	5,033,000	5,008,000	239.5
Hawaii	5	1,944,000	1,616,000	32.9	671	6	254,000	178,000	10.5
Idaho	26	1,545,000	1,476,000	97.8	1,448	100	3,992,000	3,807,000	326.5
Illinois	116	8,894,000	8,894,000	283.1	5,371	170	8,990,000	8,937,000	211.1
Indiana	51	4,503,000	4,501,000	123.8	3,800	127	4,687,000	4,676,000	161.9
Iowa	80	3,844,000	3,551,000	347.7	3,164	205	8,554,000	8,129,000	561.8
Kansas	97	3,232,000	3,087,000	301.0	2,985	243	9,157,000	8,864,000	620.0
Kentucky	52	2,177,000	2,047,000	105.8	2,874	165	6,125,000	5,904,000	462.8
Louisiana	23	3,098,000	2,565,000	54.0	1,374	70	3,053,000	3,052,000	117.2
Maine	60	1,171,000	1,152,000	41.3	2,557	172	3,104,000	3,000,000	145.4
Maryland	27	2,255,000	1,427,000	44.6	762	49	1,698,000	1,684,000	65.3
Massachusetts	14	4,530,000	4,401,000	21.6	1,000	37	2,862,000	2,531,000	57.7
Michigan	94	6,466,000	6,372,000	221.6	4,561	170	8,217,000	8,193,000	375.4
Minnesota	69	1,887,000	1,668,000	231.3	2,387	332	11,077,000	10,950,000	1,163.1
Mississippi	104	5,894,000	4,390,000	355.6	5,805	66	3,124,000	1,935,000	167.3
Missouri	75	4,457,000	4,179,000	245.7	2,966	248	9,629,000	8,886,000	790.7
Montana	30	1,718,000	1,625,000	189.6	1,581	165	8,091,000	7,437,000	644.8
Nebraska	57	4,034,000	3,579,000	215.4	2,805	164	6,975,000	5,881,000	635.6
Nevada	17	1,011,000	961,000	90.3	775	50	4,392,000	4,304,000	401.2
New Hampshire	20	812,000	777,000	22.0	544	41	1,752,000	1,693,000	48.5
New Jersey	20	3,418,000	3,225,000	27.7	1,296	39	3,013,000	2,918,000	42.7
New Mexico	29	1,774,000	1,774,000	148.5	1,831	100	5,414,000	5,270,000	514.0
New York	159	16,671,000	11,764,000	316.6	5,350	210	17,319,000	15,589,000	317.5
North Carolina	53	2,437,000	2,006,000	215.3	4,912	276	7,939,000	7,288,000	825.6
North Dakota	51	1,074,000	974,000	232.9	675	245	4,885,000	4,493,000	1,296.2
Ohio	54	1,687,000	1,546,000	96.9	2,411	331	15,756,000	14,638,000	540.8
Oklahoma	50	2,698,000	2,625,000	158.8	1,912	154	6,257,000	6,164,000	465.6
Oregon	36	1,804,000	1,668,000	79.4	769	139	6,218,000	5,717,000	317.1
Pennsylvania	209	9,095,000	8,873,000	344.3	10,957	435	13,492,000	13,129,000	632.7
Rhode Island	4	365,000	322,000	12.6	196	29	1,883,000	1,817,000	56.6
South Carolina	76	2,629,000	2,613,000	218.3	1,748	81	2,819,000	2,816,000	228.2
South Dakota	51	1,293,000	1,233,000	317.3	1,221	167	4,860,000	4,454,000	753.7
Tennessee	48	3,048,000	2,952,000	126.5	3,243	116	6,363,000	5,734,000	265.4
Texas	61	5,603,000	5,321,000	184.8	3,480	455	19,642,000	18,659,000	1,746.3
Utah	30	1,152,000	872,000	112.1	828	112	4,376,000	4,195,000	423.4
Vermont	23	620,000	602,000	30.7	899	60	1,726,000	1,655,000	88.7
Virginia	55	1,857,000	1,511,000	43.8	1,798	196	5,978,000	5,775,000	367.3
Washington	27	1,414,000	1,414,000	41.0	1,019	106	5,525,000	5,481,000	189.8
West Virginia	43	1,963,000	1,897,000	65.9	1,849	80	2,950,000	2,934,000	103.7
Wisconsin	31	1,294,000	1,079,000	53.1	613	212	9,331,000	9,054,000	435.8
Wyoming	30	1,326,000	1,221,000	148.2	559	117	4,432,000	4,186,000	639.0
Totals	2,562	$155,884,000	$138,507,000	7,259.6	117,088	7,060	$306,387,000	$285,467,000	19,462.7

Of the total, about $400,000 will be required for maintenance. If additional Federal relief money is available, it will probably be largely expended on secondary roads and grade crossing eliminations.

The construction planned for 1935 is as follows: 40 miles of grading for reconstruction and widening to cost $40,000 and to require 100,000 yards of excavation; 150 miles of crushed slag or stone surfacing, requiring 140,000 yards of excavation and costing $500,000; 25 miles of oil treatment estimated at $40,000; 5 miles of dual highway, to cost $300,000; 25 miles of low-type paving, to cost $25,000; and bridges and separations, to cost $300,000.

In addition, 100,000 yards of excavation involving an expenditure of $85,000 will be carried into this year from 1934.

Mr. Knopf says that, as was the case last year, most of the yardage, especially on dual highways and high-type roads, will be restricted to hand labor methods as a relief for unemployment.

Florida

Approximately $10,000,000 will be available for highway needs in Florida in 1935. $5,000,000 of this will be used for construction; $4,250,000 for maintenance, and $750,000 for miscellaneous items. These funds will come from the following sources, according to W. M. Boozer, Division Engineer of Plans & Surveys: state gas tax $6,500,000; regular Federal aid $1,500,000; and approximately $2,000,000 carried over into 1935 from the 1934 Emergency Relief Program.

Since the final adoption of the budget does not come until March, the 1935 construction program has not as yet been definitely outlined. Figures given are estimates, and may be changed when the Legislature meets in April.

Georgia

Georgia will probably spend approximately $15,000,000 for highways in 1935. Of this about $13,400,000 will be used for construction, $1,000,000 for maintenance, and $600,000 for other expenses. Sources of income are expected to be: emergency Federal relief, $5,900,000 state gas tax, $9,000,000; and from other sources $1,000,000. While the complete construction program has not yet been prepared, it is estimated that ⅓ of the available construction funds will be used for grading.

Idaho

Approximately $4,000,000 will be available for highway work in Idaho during 1935 according to J. H. Stemmer, Director of Highways. Of this amount $2,500,000 will be used for construction, $1,000,000 for maintenance, and $500,000 for other purposes.

● *Perry McGlone of Kansas City used a Hug Roadbuilder equipped with a special 5-yd. rock-type body under his Northwest on this road job in Pike County, Illinois.*

The anticipated income includes $1,500,000 from Federal aid, $2.500,000 from state gas tax, and $170,000 from other sources. In addition $1,000,000 is available from 1934 Federal allocations.

The construction program calls for grading 90 miles of road, surfacing the same amount, oiling 220 miles, and high-type pavement on 5 miles.

In addition to the above, $165,000 from Public Domain funds and $430,000 Forest Highways funds will be available during the year.

Work contracted for and carried over into 1935 amounts to $500,000.

Illinois

According to information received from the Division of Highways, Illinois expects to build in 1935 about 770 miles of paving and surfacing, 110 miles of heavy grading, 20 large bridges and 50 railroad grade separations. Of the mileage to be surfaced it is estimated that about 120 miles will be gravel or macadam, about 10 miles will be bituminous retread and the balance high-type pavement. The estimated cost for this work is $36,000,000.

The estimate on proposed improvements includes all uncompleted work which will be carried over into 1935 from the present construction season.

Because "diversion" suggests everything between a game of parchesi and gay night life, motor vehicle owners and their organizations are looking for a word that means something else.

For a long while, these folks have been vexed by the shifting of money raised by gasoline taxes to state funds having no connection with highway building. They have been referring to this practice as "diversion." Now they find lots of people think they have been talking about "a good time."

Some word-coiners have suggested "tax-jacking," "taxateering" and similar combinations. But, to date, none of these has found its way into the working vocabulary used by motorists.

Perhaps somebody will put an end to the whole affair by writing to Athens to see if the Greeks really do "have a word for it."

● *Building roads in Colorado usually involves moving lots of rock. Here is a typical Colorado job by Hamilton & Gleason Company. A Caterpillar Diesel Fifty and 8-yard Athey Wagon are shown.*

The estimate of additional improvements to be undertaken is necessarily based on the funds expected to be available. The $36,000,000 includes the value of uncompleted work on carried over contracts, the balance of allotments from both N.R.A. appropriations, the estimated allotment to the state from the 1935 Federal aid appropriation of $125,000,000 and state funds based on present revenues. It also assumes that about $4,000,000 in state highway funds invested in tax anticipation warrants will be released during the year and that applications pending for slightly in excess of $1,000,000 in P.W.A. 30% Grants will be approved. There is some uncertainty concerning several of these items, and if any of them should fail to materialize, Illinois funds would accordingly be reduced, which would force a reduction in the construction program.

Indiana

Indiana will have approximately $15,300,000 available for highways in 1935, according to John W. Wheeler of the State Highway Commission. $8,500,000 is estimated to go for construction, $3,400,000 for maintenance, and $3,400,000 for other expenses. This is a decrease of 31% from 1934. Approximately $5,000,000 will be available from NRH, $8,000,000 from the state gas tax, and $3,000,000 from other sources.

About 35 miles of new roads will be graded at a cost of $500,000. 150 miles will be graded for construction or widening at a cost of $400,000. The following list is the estimated types of work in the 1935 surfacing program.

	Cost	Miles
Gravel or crushed stone	$ 400,000	60
Oil treatment	200,000	150
Paving, High-Type	3,500,000	150
Paving, Low-Type	1,000,000	50
Bridges	1,500,000	

The 1935 program will include no excavation carried over from the previous year.

The road construction supervised by the Bureau of Public Roads in the fiscal year ending June 30, 1934, far exceeded the construction in any previous year, stated Thos. H. MacDonald, chief of that bureau in his annual report made public November 23.

"This increase was due primarily to grants for road construction under the National Industrial Recovery Act. The roads built have been sections of the Federal Aid highway system, extensions of the system into and through cities, important secondary or feeder roads, and sections of main highways through the national forests, parks and public lands."

The peak in employment with 336,414 at work on Federal and Federal Aid highway construction came in June 1934, when the new public works program was well advanced, according to the report. This figure represents direct employment on the roads only and does not include the indirect employment provided in the production and transportation of materials and equipment used in road construction. This indirect employment is conservatively estimated at 1.4 times the direct.

Iowa

The preparation of the annual summary of work done during the year has been delayed and did not reach us in time for this issue. We hope to present it in February.

Iowa received $5,118,361 for the fiscal year 1934-35 and on December 15, 1934 still had available $2,200,000 for new projects. For the fiscal year 1935-36 Iowa will receive $3,231,718 under the terms of the Hayden-Cartwright Act provided the State contributes a similar amount.

Kansas

Under the provisions of the National Industrial Recovery Act, Kansas receives $5,117,675 as an outright grant for road construction in 1935. Kansas expects to have this entire program under construction by the first part of January, 1935.

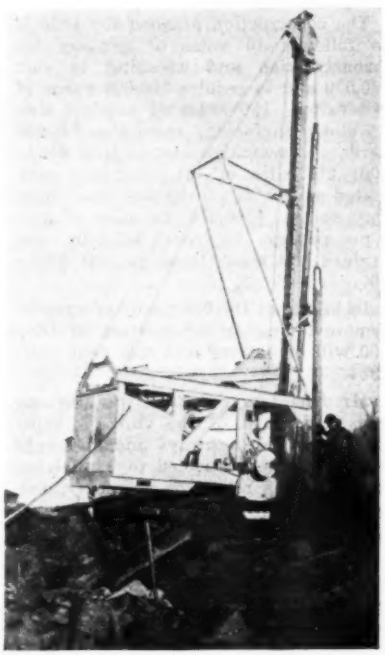
An approximate estimate as to how the $5,117,675 grant money will be expended shows: 40 miles of hard surface for $1,500,000; 206 miles grading and culverts costing $2,000,000; 280 miles light-type surfacing for $350,000; 10½ miles of bituminous surfacing for $44,000; 58 bridges costing $1,170,000; and 25 miles roadside improvement for $53,000.

Last year, the state applied to PWA for a loan and grant of $22,400,000. To date, PWA has agreed to make a loan and grant of only $5,000,000, to be used for highway construction work in 1935. In connection with the use of this sum State Highway Engineer H. D. Barnes advises that no program has, as yet, progressed sufficiently to enable him to determine the mileages of the various types of construction.

A rough estimate of state funds available for 1935 shows that Kansas will have, in addition to the above, approximately $2,300,000 for resurfacing and new construction.

Kentucky

Ben Johnson, Chairman of the Kentucky State Highway Commission, wires that sufficient information regarding the 1935 road construction program is not available at this time to present it in detail. However, estimated funds available for new con-



● The 1935 road program will require large quantities of crushed rock for aggregate and surfacing. Here a Bucyrus-Armstrong 29-T blast-hole drill is preparing rock for the Waterloo Quarry Company, Waterloo, Iowa.

● Working in the sandy loam of this borrow pit on an Indiana road job, J. C. O'Connor & Sons Company of Fort Wayne are reported to have loaded 350 five-yard trucks in three hours with this Allis-Chalmers Model "L" and 48" elevating grader.

● *Building a road in winter the Highway Department of Pratt County, Kansas uses a Caterpillar Diesel Seventy-five to pull an elevating grader of the same make. Pratt County builds all-weather roads at extremely low cost.*

struction and reconstruction amount to between six and seven million dollars.

In addition, the estimated cost to complete road projects carried over into 1935 amounts to four millions.

Expenditures for road work in 1934 amounted to approximately ten million dollars.

Under terms of the Hayden-Cartwright Act Kentucky received $3,818,311 for the 1934-35 fiscal year and will receive $2,304,143 for the 1935-36 fiscal year. The latter amount must be matched by state funds.

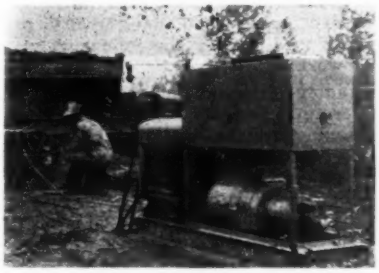
Louisiana

As of December 15, 1934 Louisiana had completed 70 projects involving 117 miles at a cost of $3,053,000; had 23 projects under construction, 54 miles, estimated to cost $3,098,000; and had available $2,663,000 for new projects.

For the 1935-36 fiscal year Louisiana will have the opportunity to match $1,776,939 of Federal funds.

Maine

It is impossible to forecast Maine's road construction for 1935. The program depends upon action taken by the Legislature which meets during the winter. It will be necessary to match the $1,090,167 alloted for the 1935-36 fiscal with state funds. Last year Maine received $1,711,586 from the Federal Government. R. M. Page, Office Engineer, states that Maine has $750,000,



● *Repairs are quickly made on a dump wagon with this P&H Hansen arc welder. Most construction organizations today find a portable welding unit an essential part of their equipment.*

"A balanced national highway program should include a program of modernization," said Captain H. C. Whitehurst, Director of Highways for the District of Columbia and President of the American Road Builders' Association, in discussing plans for the Annual Convention of that Association in January.

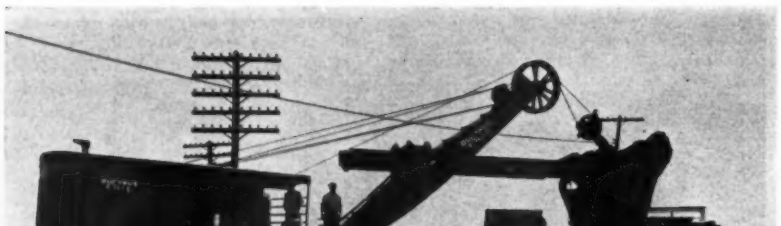
"Many of our highways," continued Captain Whitehurst, "have become obsolete due to the impossibility of foreseeing the enormous increase in traffic volume and speed. A modernization program should include widening of existing highways, adding more traffic lanes wherever necessary, also straightening curves where these are so sharp they have become a menace to the operation of the modern automobile.

"Many of our highways are fit for only horse-drawn vehicles for which they were originally built. The winding road of the 90's has no place in the transportation scheme of today although many of them still exist on our trunk line system of highways . . . "

Distribution of Federal Highway Funds 1934-35 Fiscal Year

Hayden-Cartwright Act, and Emergency Appropriation Act of June 1934.

State	Highway, Municipal, and Secondary Roads	Forest Highways	Forest Development Roads and Trails	Public Lands	Total
Alabama	$ 4,259,842	$ 6,292	$ 8,294	$	$ 4,274,428
Arizona	2,641,935	422,607	133,416	355,080	3,553,038
Arkansas	3,428,049	76,504	61,462		3,566,015
California	7,932,206	1,025,151	578,314	245,040	9,780,711
Colorado	3,486,006	531,025	125,812	92,144	4,234,987
Connecticut	1,454,868				1,454,868
Delaware	923,395				923,395
Florida	2,661,343	32,975	18,165		2,712,483
Georgia	5,113,491	15,820	17,418		5,146,729
Idaho	2,277,486	740,576	483,508	131,682	3,633,252
Illinois	8,921,401	2,051	5,151		8,928,603
Indiana	5,088,963				5,088,963
Iowa	5,118,361				5,118,361
Kansas	5,117,675				5,117,675
Kentucky	3,818,311	4,128	11,530		3,833,969
Louisiana	2,963,932	11,014	7,189		2,982,135
Maine	1,711,586	2,289	1,106		1,714,981
Maryland	1,810,058				1,810,058
Massachusetts	3,350,474				3,350,474
Michigan	6,452,568	35,523	97,472		6,585,563
Minnesota	5,425,551	68,175	44,100		5,537,826
Mississippi	3,540,227	19,799	6,912		3,566,938
Missouri	6,173,740	9,749	20,203		6,203,692
Montana	3,769,734	530,574	237,314	137,901	4,725,523
Nebraska	3,964,364	6,975	5,763		3,977,102
Nevada	2,302,356	132,492	13,904	542,125	2,990,877
New Hampshire	969,462	36,784	14,375		1,020,621
New Jersey	3,220,879				3,220,879
New Mexico	2,941,700	297,117	111,384	201,542	3,551,743
New York	11,327,921				11,327,921
North Carolina	4,840,941	22,380	23,224		4,886,545
North Dakota	2,938,967			31,619	2,970,586
Ohio	7,865,012				7,865,012
Oklahoma	4,685,180	5,858	8,937	22,580	4,722,555
Oregon	3,097,814	967,688	344,208	170,861	4,580,571
Pennsylvania	9,590,788	15,004	14,681		9,620,473
Rhode Island	1,014,572				1,014,572
South Carolina	2,770,954	9,362	4,700		2,785,016
South Dakota	3,047,643	56,954	36,441	47,891	3,188,929
Tennessee	4,302,991	19,724	21,289		4,344,004
Texas	12,291,253	6,770	3,000		12,301,023
Utah	2,132,691	243,870	62,555	283,061	2,722,177
Vermont	948,007	4,147	4,382		956,536
Virginia	3,765,387	25,858	24,884		3,816,129
Washington	3,106,412	527,466	210,843	41,244	3,885,965
West Virginia	2,280,335	20,635	31,104		2,332,074
Wisconsin	4,941,837	27,001	84,354		5,053,192
Wyoming	2,287,712	317,632	101,616	197,230	2,904,190
Dist. of Col.	973,842				973,842
Hawaii	949,778				949,778
Alaska		671,067	20,160		691,227
Puerto Rico		964	830		1,794
Totals	$200,000 000	$7,000,000	$3,000,000	$2,500,000	$212,500,000



● *Grading a new dual highway near Baltimore, Christhilf and Ensey moved 78,000 yards on their 3-mile section.*

received from Federal sources, still to be put under contract.

Maryland

According to a telegram received from H. D. Williar, Jr., Chief Engineer, no forecast is now available.

The 1935 road program depends upon action taken by the State Legislature meeting in January.

During 1934 Maryland spent $10,500,000 for road work, a portion of which came from $1,810,058 appropriated by the Federal Government under terms of the Hayden-Cartwright Act.

For the fiscal year beginning July 1, 1935, Maryland will receive $1,025,870 from this same source.

Massachusetts

According to A. W. Dean, Chief Engineer, plans for 1935 are too indefinite to even attempt to guess at what amounts of money will be available in 1935. The program will depend upon action taken by the Legislature. Massachusetts will receive $1,741,877 of Federal money for the fiscal year beginning July 1 under the terms of the Hayden-Cartwright Act. As of December 15, 1934 Massachusetts had available for new projects, $2,618,000 from the previous Federal appropriation.

Michigan

At this time all of Michigan's share of the $12,736,227 Federal grant of 1933 has been placed under contract and the work virtually completed, with a few exceptions, according to H. C. Coons, Deputy Commissioner-Chief Engineer.

About ten road and five bridge contracts, involving approximately $500,000 worth of work, will be carried over into 1935.

The following types of work make up the 1934 surfacing program:

	Miles
20-foot concrete pavement	127
Concrete pavement widening	26
Concrete pavement recapping	2
Two course gravel	196
Asphalt on concrete	10
Brick	.3
Bituminous concrete	29
One-course gravel	57
Crushed mine rock	3
Total miles	450.3

At present projects on the 1935 U. S. Public Works Highway Program are being placed under contract as fast as possible.

An estimated $4,500,000 under contract December 31, 1934, leaves approximately $2,000,000 to be contracted for early in 1935.

Mr. Coons estimates that $500,000 of the 1935 program will have been earned in 1934, and that the 1935 program will produce the following types of work:

Grading, drainage and concrete pavements	$1,703,000
Grading, drainage and gravel surface	546,000
Grading, drainage and oil aggregate surface	584,500
Bituminous concrete on gravel	358,000
Concrete pavement on present graded sections	258,825
Gravel surfacing on present graded sections	112,600
Asphalt with concrete base	615,000
Grading and drainage only	643,300
Brick on concrete base	150,000
Concrete sidewalks	7,150
Landscaping	68,000
Crossing protection signals	60,000
Bridges and grade separations	1,351,625
Total	$6,458,000

No figures are available now as to the amount of excavating which will be required for this work.

Although no state funds are expected to be available for actual construction work during the first 6 months of 1935, it is believed that funds will be available during the fiscal year beginning July 1, 1935, to match Michigan's $4,000,000 share of the Federal funds under the Hayden-Cartwright Act. It is believed that 60% of this $8,000,000 program can be placed under contract during the last 6 months of 1935.

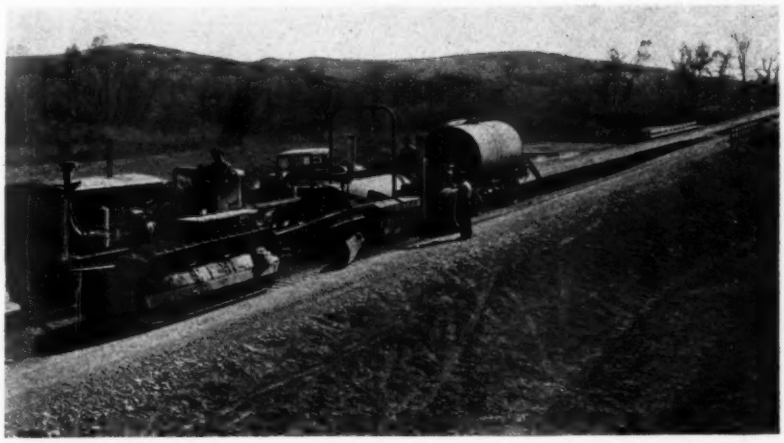
Minnesota

New construction work placed under contract during 1933 and 1934 was confined almost entirely to work financed with Federal funds. On January 1, 1935, Minnesota will still have avail-

Forest Highway Funds

From statement by Bureau of Public Roads as of October 31, 1934.

States	PROGRAMMED WORK				Balances Available For Programming	Grand Total
	Under Construction	Not Under Construction		Total		
		Under Contract	Not Under Contract			
Alabama					$ 6,230.37	$ 6,230.37
Alaska	$ 247,300.00		$ 97,500.00	$ 344,800.00	708,111.41	1,052,911.41
Arizona	213,500.00		367,662.00	581,162.00	105,578.15	686,740.15
Arkansas	90,372.00	$ 107,254.00	32,000.00	229,626.00	6,026.01	235,652.01
California	1,362,135.00	3,500.00	702,600.00	2,068,235.00	150,083.32	2,218,318.32
Colorado	588,154.00		89,977.80	678,131.80	75,603.16	753,734.96
Florida	94,145.00			94,145.00	2,784.72	96,929.72
Georgia	55,914.00		3,851.00	59,765.00	1,586.13	61,351.13
Idaho	874,217.00	64,000.00	651,000.00	1,589,217.00	113,900.28	1,703,117.28
Illinois	18,585.00			18,585.00	3,270.41	21,855.41
Kentucky			22,221.90	22,221.90	6,119.52	28,341.42
Louisiana					.56	.56
Michigan	82,615.00			82,615.00	48,096.19	130,711.19
Minnesota	27,893.00	98,235.00		126,128.00	81,480.06	207,608.06
Missouri			28,113.20	28,113.20	2,740.92	30,854.12
Montana	354,340.00	117,000.00	394,000.00	865,340.00	93,698.15	959,038.15
Nebraska	18,260.00		17,413.00	35,673.00	1,087.49	36,760.49
Nevada	20,000.00	121,200.00		141,200.00	22,817.28	164,017.28
New Hampshire	93,533.00			93,533.00	2,737.24	96,270.24
New Mexico	131,236.00	20,000.00	175,151.19	326,387.19	42,424.44	368,811.63
North Carolina	30,000.00		57,335.40	87,335.40	7,497.94	94,833.34
Oklahoma	15,610.00	4,260.00	95,000.00	114,870.00	604.05	115,474.05
Oregon	674,000.00	548,000.00		1,222,000.00	196,419.72	1,418,419.72
Pennsylvania	51,282.00		268,000.00	319,282.00	3,668.36	322,950.36
South Carolina			5,500.00	5,500.00	3,657.47	9,157.47
South Dakota	64,698.00			64,698.00	13,105.77	77,803.77
Tennessee		55,623.00	19,196.61	74,819.61	1,968.69	76,788.30
Utah	152,499.00	69,000.00	107,500.00	328,999.00	45,851.54	374,850.54
Virginia	25,497.00		44,036.10	69,533.10	5,973.04	75,506.14
Washington	368,000.00	265,000.00	361,000.00	994,000.00	115,639.32	1,109,639.32
West Virginia	31,470.00			31,470.00	23,100.95	54,570.95
Wisconsin	67,671.00	7,258.00		74,929.00	27,859.75	102,788.75
Wyoming	378,875.00		76,955.56	455,830.56	44,781.12	500,611.68
Total	$ 6,131,801.00	$ 1,480,330.00	$ 3,616,013.76	$11,228,144.76	$ 1,964,503.53	$13,192,648.29



● Inland Construction Company of Omaha are here applying black top between Sheridan, Wyoming, and Billings, Montana with a Caterpillar Diesel 75 pulling a Wood's Traveling Mixer.

able for contract approximately $600,000 from the 1933 NRA, and $2,000,000 from the 1934 NRA.

No figures are at present available regarding additional funds for 1935, according to O. L. Kipp, Construction Engineer. If the Legislature appropriates sufficient funds to match the aid provided in the Hayden-Cartwright Act, a $7,000,000 construction program will be financed for the fiscal year, 1935-1936 and a major part of the work will probably be placed under contract during 1935.

● Adolphson & Huseth of Thief River Falls, Minn., shape the bank of this highway near Ortonville with an Allis Chalmers Model "L" tractor and No. 1½ grader. Telephone poles cause no delay here. The leaning frame of the grader allows the machine to pass around the pole without pulling the grader away from the bank.

Mississippi

Approximately $8,700,000 is expected to be available for highways in this state in 1935. This is an increase of 50% over 1934. $6,000,000 will be used for construction, $2,500,000 for maintenance, and $200,000 for other purposes, according to the State Highway Department. It is estimated that $1,600,000 will come through Federal aid, $3,500,000 from emergency Federal relief, $3,500,000 from the state gas tax, and $100,000 from other sources. About 35% of these funds will be expended grading new roads or grading for construction or widening, 50% for surfacing of various kinds, and 15% for bridges.

About 1,000,000 yards of excavation for road work, to cost $250,000 will be carried over into 1935.

Missouri

Because Missouri's 1935 construction program has not yet been definitely outlined, Chief Engineer T. H. Cutler is unable to furnish a detailed statement at the present time. However, in general, Missouri will have available for highway construction in 1935 approximately $12,500,000, and for maintenance about $4,250,000. This indicates very little difference from last year's activities.

Four million dollars of the funds available for construction will be Federal aid, to be matched with state funds under the Hayden-Cartwright Act. Emergency Federal relief (NRA) funds carried over from last year amount to $3,500,000; state gasoline tax and license fee receipts will provide about $2,500,000; and bonds to be sold amount to $2,500,000.

Approximately $4,000,000 of this amount will be expended for supplementary or low-type construction, involving grading, bridging, and gravel surfacing. Approximately $1,000,000 will be spent for low cost bituminous surfacing. The remainder of the money will be spent on the major road system, involving grading, bridging, and surfacing.

Montana

Approximately $5,700,000 will be available for highways in 1935, according to R. D. Rader, State Highway Engineer. $3,700,000 of this will be for construction, $1,100,000 for maintenance, and $900,000 for other uses. This estimate is a decrease of $3,000,000 from the amount spent in 1934. $2,500,000 of the money is expected to come from Federal aid, and $3,200,000 from the state gas tax. The construction funds will be divided approximately as follows: 170 miles of grading new roads, to cost $1,500,000; 300 miles of gravel or crushed stone surfacing, to cost $800,000; 280 miles of oil treatment surfacing, to cost $800,000; and work on bridges to cost $600,000.

Nebraska

The Department of Roads and Irrigation is unable to make a forecast of Nebraska's 1935 road construction program at this time. Plans are dependent upon the action taken by the State Legislature meeting in January.

(Continued on Page 26)

National Park Road Funds

From statement by Bureau of Public Roads as of October 31, 1934.

States	Under Construction	Not Under Construction		Total
		Under Contract	Not Under Contract	
Arizona	$ 207,807	$329,289	$ 104,265	$ 641,361
Arkansas			250,180	250,180
California	808,309		548,621	1,356,930
Colorado	119,505		412,110	531,615
District of Columbia	325,000		418,976	743,976
Georgia		132,000	448,047	580,047
Hawaii	393,104			393,104
Louisiana			19,310	19,310
Maine	52,450		273,498	325,948
Maryland			19,300	19,300
Mississippi	17,000		685,500	702,500
Montana	784,113		210,500	994,613
New Jersey	19,500		277,900	297,400
New Mexico	180,000		15,000	195,000
North Carolina	379,822	34,755	2,628,345	3,042,922
Oregon	529,500		161,750	691,250
Pennsylvania		42,000	66,200	108,200
South Dakota			15,392	15,392
Tennessee	1,211,772	65,000	659,361	1,936,133
Utah			49,603	49,603
Virginia	2,736,811	67,223	4,755,652	7,559,686
Washington	1,153,789		479,969	1,633,758
Wyoming	2,017,335	91,000	545,206	2,653,541
Totals	$10,935,817	$761,267	$13,044,685	$24,741,769

Total Unauthorized $2,616,270.

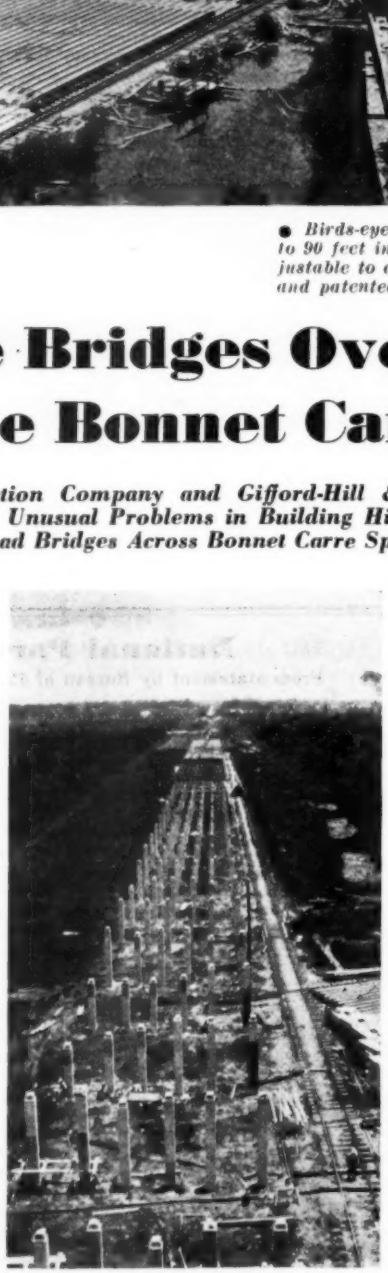
● *Birds-eye view of the casting yard. Here the piling, to 90 feet in length, was cast in special steel forms adjustable to any size square. These forms were designed and patented by the Keliher organization.*

Building the Bridges Over the Bonnet Carre Spillway

Keliher Construction Company and Gifford-Hill & Company, Inc., Encounter Unusual Problems in Building Highway and Railroad Bridges Across Bonnet Carre Spillway.

ABOUT TWENTY-EIGHT miles north of New Orleans it is necessary to take the new Air Line Highway between Baton Rouge and New Orleans, together with three railroads, the Illinois Central, Yazoo and Mississippi Valley, and the Louisiana & Arkansas, across the Bonnet Carre flood spillway just inside the gates which will open to relieve the pressure when flood waters on the Mississippi imperil New Orleans.

Involved in all four projects were the problems of soft footing, alluvial soil saturated to the ground level, no reachable foundation support, difficulty in securing material for the approach fills that would stand with reasonable firmness and that could be handled economically, and the difficulty of building and maintaining suitable roadway from borrow pits to the fills. In connection with the highway approach there was an additional problem in an old ditch which had been cut across the north approach at right angles by an hydraulic dredge. This left a canal which had to be closed and filled and which was about 430 feet wide and approximately 50 feet deep.



The four different jobs were each divided into two sections, one involving the pile driving and bridge construction, the other the approach work. Keliher Construction Company of Dallas, Texas, secured the sections on bridge work and Gifford-Hill & Company, Inc., also of Dallas, were successful bidders on the approaches.

● *Birds-eye view showing 22 days of pile driving in place.*

The largest and most difficult of the contracts were those concerned with the highway bridge which will carry Hughey Long's pet Air Line road across the spillway. 6,000 feet of concrete pile trestle was required.

Test Piles Measure Load Limits

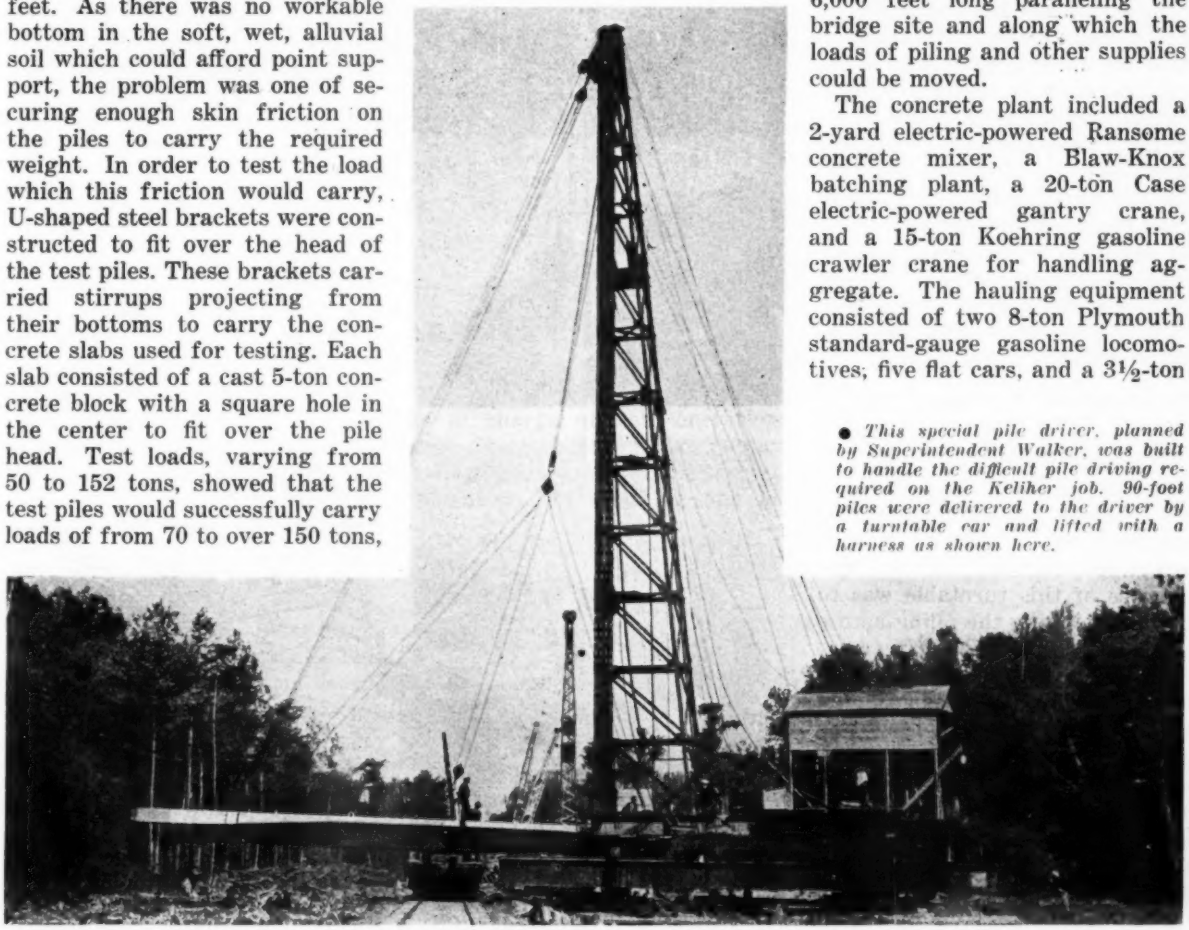
The first step in its building was to drive a series of test piles to determine the length of piling and the number of piles required to carry the load. Six alternative designs for the trestle had been prepared and selection of the most suitable one depended on the nature of these tests. Keliher Construction Company built their construction railroad across the bottom of the spillway paralleling the side of the bridge and proceeded to drive these test piles, 48 of them, placed at intervals of 100 feet, across from north to south. The test piles of precast concrete were 20 inches square and 75 feet long, and were driven with penetration from 55 to 70 feet. As there was no workable bottom in the soft, wet, alluvial soil which could afford point support, the problem was one of securing enough skin friction on the piles to carry the required weight. In order to test the load which this friction would carry, U-shaped steel brackets were constructed to fit over the head of the test piles. These brackets carried stirrups projecting from their bottoms to carry the concrete slabs used for testing. Each slab consisted of a cast 5-ton concrete block with a square hole in the center to fit over the pile head. Test loads, varying from 50 to 152 tons, showed that the test piles would successfully carry loads of from 70 to over 150 tons, depending on locations and penetration.

● *Fabricating reinforcing cages for piling, (foreground) and part of pile casting yard. Driver is shown in the background.*

Based on these experiments a trestle design was adopted with 156 six-pile bents and 38-foot-9-inch spans, center to center, giving a maximum load per pile of 43 tons including the maximum live load and the dead load. The length of the piling was varied from 75 to 90 feet in order to equalize a load carrying ability in accordance with the requirements shown by the tests. In all, 76,000 feet of the 20-inch square precast concrete piling were required. The total length of the bridge was approximately 6,000 feet, with a reinforced concrete deck girder and a roadway 40-feet wide, clear.

The construction plant had already been laid out for the handling of the test piles. It consisted of a spur track 2,000 feet long from the Louisiana and Arkansas Railroad to the plant site at one end of the bridge and another standard gauge line, 6,000 feet long paralleling the bridge site and along which the loads of piling and other supplies could be moved.

The concrete plant included a 2-yard electric-powered Ransome concrete mixer, a Blaw-Knox batching plant, a 20-ton Case electric-powered gantry crane, and a 15-ton Koehring gasoline crawler crane for handling aggregate. The hauling equipment consisted of two 8-ton Plymouth standard-gauge gasoline locomotives; five flat cars, and a 3½-ton



● *This special pile driver, planned by Superintendent Walker, was built to handle the difficult pile driving required on the Keliher job. 90-foot piles were delivered to the driver by a turntable car and lifted with a harness as shown here.*

● *Another view of the Keliher pile-driving operation showing a Plymouth locomotive with the turntable car on spot and one of the concrete piles in the air.*

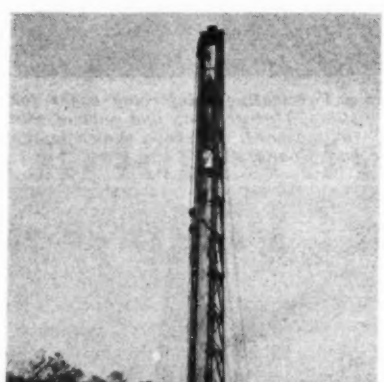
Whitcomb gasoline locomotive used with a 5-ton home made derrick car for handling forms.

Special Pile Driver

For driving the concrete piling (these ran up to 90 feet in length), a special pile driver was built to fit the requirements of this work. It was of the revolver type with leads 100 feet high. It was moved alongside the track on rails on timbers, and the revolving frame could travel back and forth at right angles to the right-of-way along rails laid on the large I-beams of the base. This feature plus the revolving radius gave the machine sufficient range to drive piles full width of the bent from one set-up. An American five-drum hoist with independent swing engine supplied the power.

Turntable-car Transports Piling to Driver

For transporting the long and heavy piling from the pile yard to the driver, a special turntable was built on an ordinary, standard-gauge, railroad flat car. The purpose of this turntable was to permit swinging the piling across the car and over toward the driver at the driving location. This lessened the possibility of tipping the driver when the piling was picked up to be placed in the leads. In order to prevent damage to the piling a special equalizer boom with a three-point suspension was used in taking the piling off the pile car for placing in the leads. The degree of perfection of the pile handling and driving equipment is evidenced by the fact that almost 1,000 piles were handled and driven without a single rejection under rigid inspection.



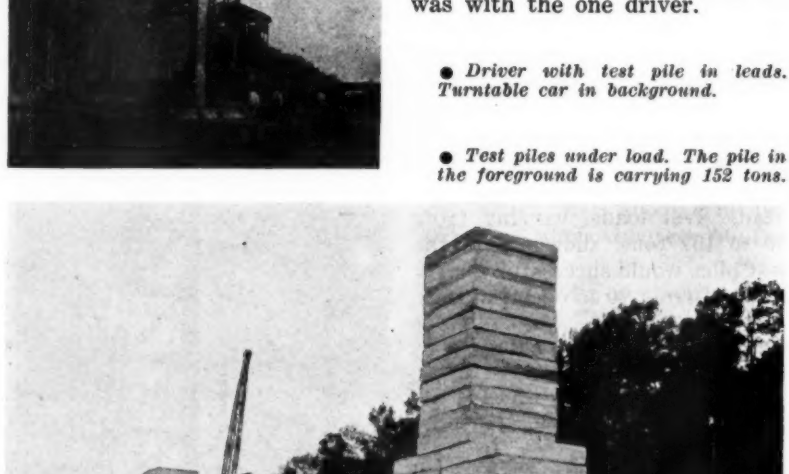
● *Driver with test pile in leads. Turntable car in background.*

Cast in Special Forms

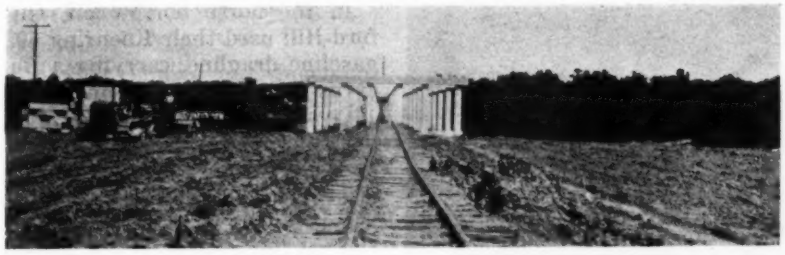
The test piles were cast in wooden forms. Steel forms, adjustable to any size square pile, designed and patented by Keliher Construction Company, were used for the permanent piling. Concrete in two-yard quantities was transported from the mixer to the pile forms by the gantry crane. For curing, the piling was covered with heavy burlap which was kept saturated with water for about ten days. In order to reduce the curing period from 30 to 10 days, Incor high early strength cement was used in all piling.

Up to Fifteen Ninety-Footers Driven per Day

The permanent piles were cast and driven at an average rate of approximately 1,000 lineal feet per day from beginning to completion. As many as fifteen 90-foot piles were driven in one day, a total daily footage of 1350 feet. On many days eighteen 75-foot piles were driven. This progress was with the one driver.



● *Test piles under load. The pile in the foreground is carrying 152 tons.*



● *Grading fill on the south highway approach with Caterpillar tractor and blade. In the background the piling is completed and the caps are in place.*

The total contract involves, in addition to the piling, 13,600 cubic yards of concrete, 3,600 tons of reinforcing steel, and 120 tons of structural steel.

Steel from Portable Bender Placed at Point of Use

All the reinforcing steel was cut and bent on the job, being unloaded directly from the railroad cars to bending machines which traveled on the standard gauge track bending the steel for each span and placing it ready for use on the ground opposite the particular span in which it was to be used. A great economy in handling was thus effected, twenty-two tons being fabricated daily.

● *South borrow pit on the Gifford-Hill approach work. Note comparative size of the 3½-yard bucket on the Bucyrus-Monighan and the ¼-yard Western car.*

The deck consists of six concrete girders carrying the flat slab. The forms are supported by steel I-beams and the overhang and fascia girder forms are lined with Masonite tempered board.

Two spans of deck were placed daily and an average of ten spans were completed each week. This included the wrecking of forms, moving ahead, rebuilding, placing 22 tons of reinforcing and approximately 150 yards of concrete. The concrete in a span was placed in about 2½ hours.

An excellent performance record has been shown all through this work. Driving and loading the test piles required sixty days and the first permanent pile was driven June 16th, 1934. The entire structure will be complete about March 1st, 1935. As this is written the job is about thirty days ahead of schedule.

Superintendent Gordon Walker is in charge of field operations for the Keliher Construction Company and has done an excellent job of planning and organizing the work. President L. J. N. Keliher comments that Mr. Walker should have full credit for a large number of the new and ingenious methods used on the project.

Excavating Problems

Gifford-Hill & Company, Inc. of Dallas, has the approach contract (Unit 2 of U. S. Public Works NRH 173-F) for the Airline Highway bridge. This involves some 660,000 yards of dirt and looked like a tough one because of the soft muck of the bottom lands on which the fill must be built, hauling carried on, and in which the State borrow pits were located. Also, there was the 430-foot wide hydraulic dredge cut at right angles across the middle of the north approach to span and fill.

Gifford-Hill quickly decided that it would be cheaper to buy private borrow pits provided some sort of fairly dry and solid material could be located within reasonable distance rather than attempt to work the soft silt of the State borrow pits which were located in the spillway bottom and carried ground water level at their surface. Fairly good material was located in the dry about three-fourths miles from the north end, and in a second pit about a half-mile from the south end.

These pits were purchased from the private owners as they offered dry material which would "stay put" and pack fairly well on the fill, and work could be handled in practically any weather. Their location also gave a straight line haul and favorable

● *View of portion of bridge completed (except handrail) on November 15, 1934.*

● *Spreading the fill on the south highway approach. A one-yard Bucyrus-Erie and a one-and-three-fourths-yard P&H spread the dirt dumped along the central track.*

grade while the hauling out of the spillway bottom would have been more unfavorable, both as to direction and as to grades.

36″ gauge track with 75-lb. rail was laid on full length standard ties which were placed close together to give a substantial road bed over which trains could move safely up to at least 20 miles an hour. Seven Plymouth locomotives were used for hauling, two of them 12-ton, and five 8-ton. Cars consisted of 60 Westerns of 4-yard capacity.

Target Shooting!

In the south borrow pit loading was handled by a 3½-yard Bucyrus-Monighan Walking Dragline. This machine seems rather large for loading the 4-yard hauling units, but the combination certainly worked out very nicely. One bucket was loaded to a car, and, because of the nature of the material, carried a large heap so that the dumped material filled the car heaping full. The experienced operators showed themselves crack target shooters, for they seemed to be able to hit the mark dead center every time and that is quite a trick when you are using a 3½-yard bucket out on the end of a 70-foot boom, even with the finest of machine control.

This south pit was excavated about four feet deep to the ground water level. The surface was full of stumps and these were pulled by the walking dragline, which yanked them out readily, and set them aside where they would be out of the way.

● *The fill on the north approach had to cross an old dredge channel 430 feet wide, 50 feet deep. Gifford-Hill did the trick by dumping from this pontoon bridge.*

In the north borrow pit, Gifford-Hill used their Koehring 502 gasoline dragline, carrying a Bucyrus-Erie Red Arch Bucket of 1¾-yards capacity. Here the dragline operators had a little better break in the proportionate size of bucket and car, and the "shots" were at closer range as the maximum range was at the end of a 45-foot boom. Two of the heaping buckets put a good load on the 4-yard cars. This pit yielded material about five feet deep, and was a bad one for stumps, some of which could not be readily removed, and were left where they stood.

Spread Fill with Draglines

In place of attempting to shift track on the approach fills, Gifford-Hill laid their line right down the center of the right-of-way. The cars were dumped to either side, and the track raised as the fill went up. Two draglines, one on each side along the track, spread the dirt out on the fill as it was dumped, and thus permitted carrying the full width of the fill up as the track was raised. The machines, of course, come in handy when it comes to raising and leveling up the dump track, and, for this job, the method worked out in beautiful shape.

● *Loading 20-yard Westerns with Bucyrus-Erie 2-yard electric dragline in the railroad-fill borrow pit.*

For the spreading work on the south end, Gifford-Hill used their Bucyrus-Erie Type 1035 gasoline machine with a 1-yard Red Arch Bucket, and a P&H 700 with a 1¾-yard bucket. On the north end another P&H 700 1¾-yard and a Northwest 104 1-yard handled the spreading.

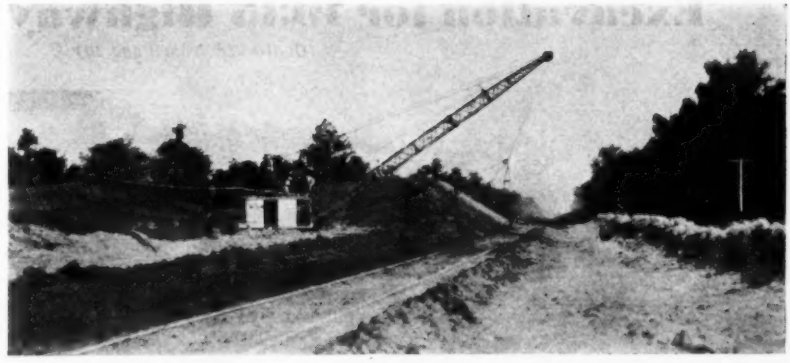
Pontoon Bridge Spans Dredge Cut

A very simple and ingenious method solved the problem of the hydraulic dredge cut across the north approach. 430 feet wide and 50 feet deep, this ditch looked like quite a hurdle. Gifford-Hill bridged it on two electric-welded steel pontoons measuring about 20x30 feet. The track was laid across on these steel scows, and they were found to carry the load very nicely. When enough dirt had been filled in to permit

● *From one of the pontoons we see the Gifford-Hill dump gang spilling a train of 4-yard Westerns.*

shifting the track to the filled material, the pontoons were slid out from under for possible future use.

The maximum height required for the approach fills was 24′, the top grade was 52′ wide, and slopes were carried at three to one. This gave a maximum base of 196 feet. Because of the considerable settling of material and foundations, a large amount of extra dirt was required for the fills. They were graded as they went into place with the draglines which spread the fill material, and also by a Caterpillar tractor with an Adams 12-foot blade. While the material used and the method of placing secured a cohesive and well packed fill, a period of at least a year will be allowed for settling before the slab is placed.



● *This Bucyrus-Erie 45-B dragline builds the L&A railroad fill by stacking up the material dumped on the ground level.*

"Working on the Railroad"

The adjoining railroad jobs may be summarized in short order as they are handled in a manner similar to the highway job. The Gifford-Hill contract for the approaches on the Y.&M.V., requires movement of about 100,000 cubic yards. Here also a special borrow pit has been secured and loading is being handled with a Bucyrus-Erie 50-B electric dragline, carrying a two-yard Bucyrus-Erie Type U Red Arch bucket on a 50′ boom. Depth of borrow averages about five feet. Track is standard gauge and twenty 20-yard Western air-dumps move the dirt behind two Baldwin 60-ton steam locomotives.

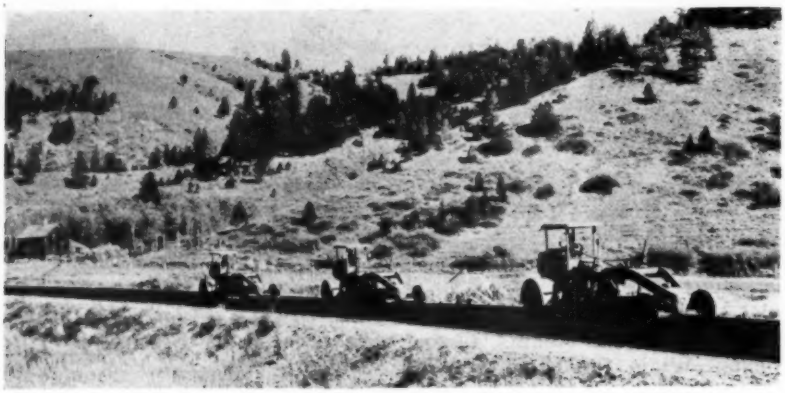
It just happened that Gifford-Hill still had available this 50-B electric which was purchased for a gravel pit they were working a number of years ago. When this job worked itself out, the machine was sent to their storage yard to await re-sale. It had paid for itself and earned a pension besides, and it didn't seem likely that this contracting organization would soon have occasion to again make use of this electric-powered machine. Then along came this fill job, only two miles from a power line, and the 50-B electric was just the ticket. Energy is brought in from the main power line at 2300 volts and stepped down at the pit to 440. The 440-volt power line parallels the borrow pit and is arranged so that the power cable for the shovel can be plugged in at a number of convenient places. This ma-

(Continued on Page 60)

● *The completed south approach for the Y&MV. A nice job of finishing!*

Excavation for 1935 Highway Construction

(Continued from Page 19)



● *A road building scene in Montana. Three Allis Chalmers Speed Patrols work the gravel and oil into a smooth durable surface.*

Nebraska will receive $2,581,663 from the Federal Government under terms of the Hayden-Cartwright Act for the 1935-36 fiscal year. This amount must be matched by state funds. The amount required for maintenance will be approximately $3,200,000.

During the past year Nebraska spent approximately $9,000,000 for road improvements. $4,100,000 was used to grade 424 miles including small structures, involving 6,700,000 yards of excavation. $800,000 was used to gravel 384 miles requiring 514,000 yards of gravel. 94 miles of high-type pavement were laid at a cost of $2,000,000. 211 miles received oil treatment costing $1,100,000 and requiring 4,600,000 gallons of oil. In addition, 155 bridges, 6 viaducts and 1 subway were built at a cost of $1,000,000.

Nevada

Since 1931, the fiscal year for Nevada has corresponded with the Federal fiscal year running from July 1 to June 30. The following data on road work is for the fiscal year 1934-35. Out of a total appropriation of $3,744,481; $2,844,481 is to be spent for new construction, $650,000 for maintenance, and $250,000 for other expenses. Nevada's income for road work, according to S. S. Durkee, State Highway Engineer, will include $2,844,481 received from Federal emergency funds, $750,000 from state gas tax, and $150,000 from other sources.

This fiscal year's construction work is as follows: $500,000 will be spent for grading 106.55 miles of new roads requiring 950,000 yards of excavation; $1,195,000 for reconstructing and widening 169.36 miles requiring 1,500,000 yards of excavation; $600,000 for graveling and stone surfacing 222.29 miles involving 890,000 tons of material; $375,000 for oil treatment on 140.14 miles requiring 3,500,000 gallons of oil; and $175,000 for high-type pavement on 7.38 miles.

In addition, there was carried over from the previous fiscal year ending June 30, 1934, contract work amounting to $375,000 involving 1,000,000 yards of excavation.

● *Above: This batching plant set up to serve a New York road job is fed by a Bucyrus-Erie clamshell machine powered with a Caterpillar Diesel engine. Wm. P. McDonald Construction Company of Flushing is the contractor.*

● *Below: Working on a road job near Waterbury, Nebraska, Geo. W. Condon Company of Omaha hauls the dirt with a fleet of five bottom dump Euclid "Truks".*

New Hampshire

$6,125,000 is the estimated amount New Hampshire will have available for 1935 highway work. $1,900,000 will be for construction, $3,225,00 for maintenance, and $1,000,000 for other uses. This figure is a 17% decrease from 1934. $625,000 is expected to come from Federal aid, $4,500,000 from the state gas tax and motor vehicle fees, and $1,000,000 from a bond issue.

Approximately 150,000 yards of excavation, to cost $110,000, will be carried over from 1934. No program for the use of 1935 funds is available at this time.

New Jersey

New Jersey's 1935 road program is entirely tentative until such time as it has been passed upon by the Legislature. An original and alternative program have been made up and recommended to the Governor and Legislature for approval. The original program calls for 95.9 miles of new road work, mostly paved with concrete, to cost $10,532,397. This figure includes right-of-way purchases and $432,000 for miscellaneous items. The alternative program calls for 65.7 miles of construction costing $14,600,000. Nothing can be said at this time as to when either of the programs will be approved and work started. Many of the projects have not yet been surveyed.

1935 funds expected to be available for construction, are made up of $3,200,000 from Federal aid, $2,550,000 from state gas tax and motor vehicle license fees, and $3,000,000 from authorized highway bond issues. The total shows a decrease from last year's program of about $3,000,000.

In addition to the construction program, the Highway Commission has requested a sum of $2,500,000 for maintenance purposes in 1935.

Actual awarding of contracts on New Jersey's 1934 road program did

not begin until late in the year. It is estimated that only about $600,000 had been expended up to December 31, 1934, out of the $8,000,000 approved for road work. In addition, the 1934 program authorized $4,600,000 for bridges making the total available for construction $12,600,000.

Practically all the work included in the 1934 program will be contracted for and perhaps performed in 1935, with the possibility that some of it will carry over into 1936.

The allotment of National Industrial Recovery moneys to New Jersey by the Federal Government in 1934 amounted to $3,420,879, of which $695,000 was set up for bridge construction and $2,725,879 for roads. An amount of $5,415,481 was set up in the 1934 program representing money received from gas tax and motor vehicle fees. Gas tax collected in New Jersey in 1934 will amount to approximately $16,200,000, and motor vehicle fees, fines, etc., will represent another $14,500,000. The bulk of this money goes to debt service, state aid work, administration, other mandatory deductions, etc.

New Mexico

The highway program for the coming fiscal year, 1935-36, will not be made up for some time, consequently at present it is only possible to give the work remaining on the 1934-35 program.

The volume of construction for the entire year was practically the same as last, according to G. D. Macy, State Highway Engineer. $4,500,000 was set up for new construction, $900,000 for maintenance and $2,850,000 for engineering expenses, debentures and other items. These funds originated as follows: $1,900,000 from regular Federal aid; $1,390,000 from emergency Federal relief $2,725,000 from state gas tax, and $2,135,000 from other sources.

Several projects remain to be placed under contract shortly. These are: 26.2 miles of reconstruction with two railroad separations to cost $285,000 (NRH 27); 5.2 miles of grading, and base course to cost $119,000 (NRH 165-E); 15.1 miles of reconstruction with base course to cost $116,000 (NRH 131); 11.6 miles of grading with one railroad separation to cost $200,000 (NRFL); 8 miles of surfacing to cost $30,000 (NRS); 37.6 miles of grading, draining and surfacing, to cost $360,000 (NRS), and 3.8 miles of grading and high-type pavement to cost $260,000 (NRM).

Excavation work contracted for but not completed is estimated at $200,000 involving 800,000 yards.

● *A quarry scene in New York. Joseph Walker of Gloversville uses this Bucyrus-Armstrong No. 29 blast-hole drill to prepare the rock for blasting.*

Work and wages for one out of every six persons in the nation's wholesale, retail and service trades are provided by firms wholly dependent upon automotive, petroleum, tire and other sales connected with highway use, according to new Census Bureau figures as compiled by the National Highway Users Conference.

This statement, transmitted to Federal and state officials, shows 383,847 of the 2,133,437 wholesale, retail and service establishments operating in the United States in 1933 relied entirely upon sales to owners and operators of motor vehicles.

Analysis of the government figures also develops the following: Of the total payroll of $5,058,803,000 for all wholesale, retail and service trades, $801,006,000, or 15.9 per cent, accrued from automotive, petroleum, tire and allied trades.

● *M. F. Quill & Son had to cut through a 10-inch layer of concrete on their water-main extension job in Cincinnati. The Sullivan two-stage air-cooled compressor in the foreground furnished air for the concrete busters and trench spaders.*

New York

No forecast of 1935 highway construction can be made until the budget is released by the Governor.

During 1934 the Division of Highways awarded contracts for 457.92 miles of new work requiring an expenditure of $21,452,794.

On bids taken December 18, contracts will probably not be awarded until after January 1, 1935. Mileage involved is 33.48 and funds obligated are $893,350.

Under the Hayden-Cartwright Act New York receives $6,150,106 for the fiscal year beginning July 1, 1935.

North Carolina

North Carolina will have $17,375,000 for 1935 highway work, provided the State Legislature agrees to match Federal funds available under the Hayden-Cartwright Act. $7,375,000 of this will be used for construction, and $10,000,000 for maintenance, according to M. W. Baise, Acting State Highway Engineer. These figures are approximately the same as in 1934. 21% of the funds will come from Federal aid—again if the Legislature matches government funds—58% from emergency Federal relief, and 21% from the state gas tax.

It is planned to grade 300 miles of new roads at a cost of $1,800,000, and to grade for reconstruction or widening 75 miles at a cost of $75,000. Also planned is the following surfacing: 180 miles of gravel or crushed stone for $900,000; 500 miles of oil treatment for $1,900,000; 60 miles of high-type pav-

(Continued on Page 46)

EXCAVATING ENGINEER
FOUNDED 1935

A Monthly Publication Devoted to Excavating and Allied Subjects

The Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

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Managing Editor

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The Business Situation

THE FIRST of the year has grown to be the accepted time for making prognostications in regard to business. Dangerously prone to generating embarrassment at any time, prophecies are particularly failing in this regard at present.

We, in this country, are attempting a managed recovery, and while we are unquestionably making progress, we are making progress somewhat more slowly than other countries which have experienced this same depression. As has been pointed out many times, the great depression has been world-wide, has been experienced by practically every country. In some countries it came a little earlier than it did in the United States and in many countries, faster recovery is being made than in our own. It is next to impossible to make definite comparison of causes and effects in several countries, and draw therefrom the correct empirical equation for accelerating business activity. But many of the best business brains seem to agree on several things which must be done if a managed recovery is to be effective.

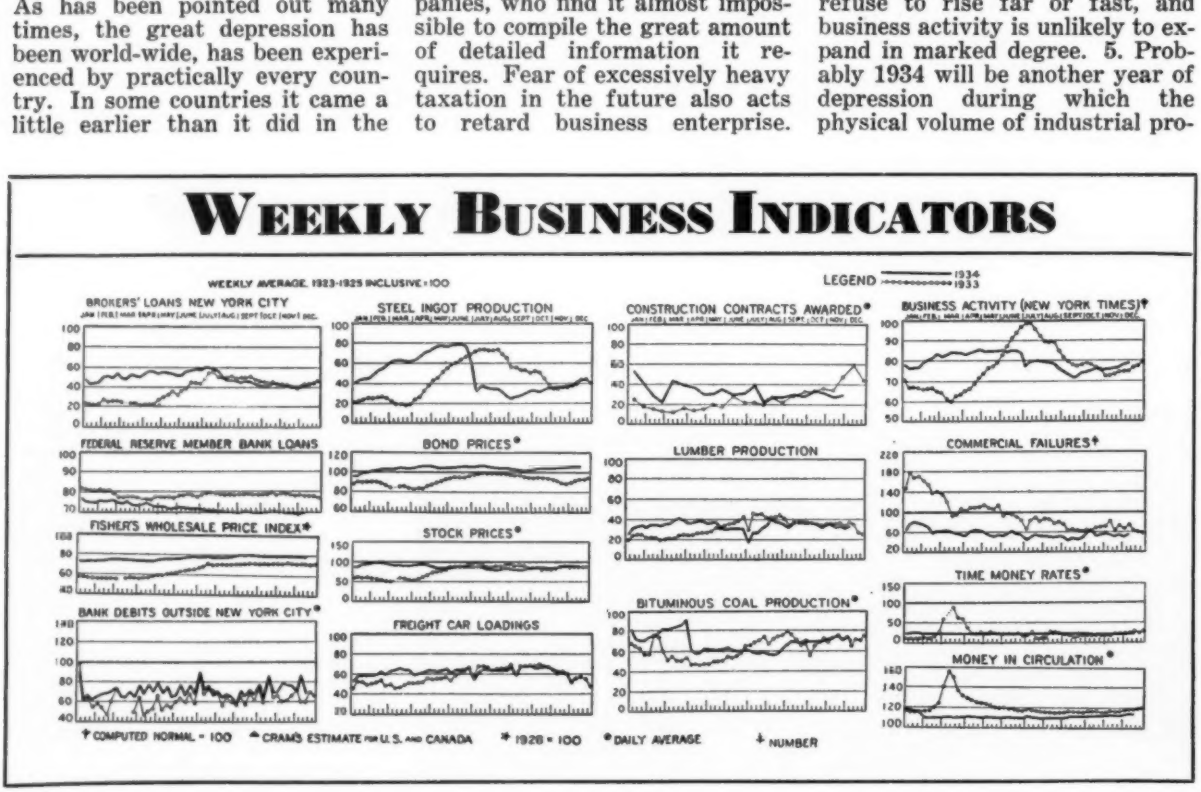
So far we have poured many millions into the "priming of the pump," but are faced with the fact that some adjustments to the pump are necessary to make it respond adequately to the priming. It seems generally accepted that before full recovery can be experienced, the path must be cleared for private capital and private enterprise again effectively to enter business. Doubts about profits under present conditions are today a serious drawback to rapid business expansion; for example, industry watches the effects of government regulation of utilities with serious misgivings. Fear of our money's future is one factor which is holding back private investment, and the Securities Act is another effective blockade to the flotation of new bond issues by established companies, who find it almost impossible to compile the great amount of detailed information it requires. Fear of excessively heavy taxation in the future also acts to retard business enterprise. These four danger points could be readily corrected by three measures:

1. Give business the power to govern itself and then let it do so; 2. move definitely toward a balancing of the budget and sound money; 3. revise the Securities Act to make the issuance of new securities as inexpensive a procedure as possible—with due regard to safeguarding the interests of investors.

A year ago the Cleveland Trust Company in its Business Bulletin issued fourteen specific forecasts for 1934. During the year developments have shown all of them to be substantially correct. This year the same forecasts have been reprinted with the statement that it appears likely "that they will remain valid for 1935." They are as sound as any we have seen and we reprint them here:

The forecasts for 1934 were as follows: 1. It is not likely that we shall experience uncontrolled inflation in 1934. 2. The administration will probably adopt an irregular and unplanned crystallizing of financial policy with reasonable stabilization of values. 3. Business conditions in 1934 promise to be similar to those of the latter months of 1933. 4. Commodity prices will stubbornly refuse to rise far or fast, and business activity is unlikely to expand in marked degree. 5. Probably 1934 will be another year of depression during which the physical volume of industrial pro-

WEEKLY BUSINESS INDICATORS



duction will not be as great in any month as it was in July of 1933, or as small as it was in March of 1933. 6. Our financial policies will probably impel other nations to retaliations, trade restrictions, and ill-will. 7. Production of durable goods is likely to remain restricted, with continuing serious unemployment. 8. Expenditures for unemployment relief will be very large, and taxes heavier. 9. Price fluctuations in the security markets are likely to be narrow and irregular. 10. In 1934 it will probably be as difficult for the operator in the stock market to make speculative profits, or to find safe refuge for conserving funds, as it was in the last half of 1933. 11. The volume of privately financed building construction will be small. 12. Many lines of consumers goods should do well, and some durable goods such as radios, labor saving office equipment, household equipment, and agricultural implements. 13. The output of automobiles should be larger in 1934 than in the previous year. 14. Probably 1934 will be a year of much debate about money, and discussion of the conflicts between recovery measures and reform measures.

Are You Watching for This Kind of Work?

THE U. S. Government is spending some $20,000,000 for soil erosion work . . . has given out reams of publicity on the value of conserving and properly utilizing valuable soil which is being lost through erosion.

Here is what is claimed to be the world's largest concentration of tractors on any one project . . . 36 machines, most of them powered with Diesel engines, at work on the Pima Indian Reservation near Sacaton, Arizona. The land is being leveled, by filling up the gullies and channels cut by water, making it suitable for use.

Excavating contractors have available trained organizations and suitable equipment for this type of work. The Federal Government has repeatedly stated that private operators will be given preference whenever work can be handled economically by contract. As yet soil erosion work is in its experimental stages . . . but dirt movers should keep in close touch with this program. Many projects on the program are likely to involve excavating, terracing, leveling, drainage channels, and dams, with quantities sufficiently large to be of decided interest to excavating contractors.

Highway Safety

WITH THE increases in speed made possible by modern automobiles, and invited by the paved highways of today, safety is becoming a problem which must be dealt with and dealt with now. In 1933, 31,000 people were killed by automobiles in this country, and 1,000,000 were seriously injured—one out of every 100 people in the United States! This was a sharp increase in fatalities and injuries over 1932, but 1934 figures show that the upward trend is still continuing.

Recognizing the serious nature of the situation, the National Conference on Street and Highway Safety has made the following recommendations for highway improvement:

1. Sidewalks along the highways.
2. Non-skid surfaces.
3. Center stripes to form two separate roadways.
4. Elimination of multiple intersections.
5. Rotary traffic islands.
6. Segregation of through traffic from local traffic.
7. Street and highway illumination.
8. Streets in residential developments planned to avoid pedestrian hazards.

Much would be accomplished by following such a program. But in addition to all material aids to safety, there should be a constant campaign to educate every person who now uses, or someday will use, the streets and highways, to the vital importance of constant caution.

The expense of a complete and effective safety program may be large; it cannot be large enough to justify delay. Lives and limbs lost in accidents cannot be replaced. They are a loss too great to be borne by any country.

Beg Your Pardon

THE DECEMBER issue carried an article "Controlling Flood Waters on the Chama River" by Geo. E. Moore. Through error, entirely unintentional, mention made by the author of H. V. R. Thorne, Superintendent of Construction, was omitted. The following should have appeared in the story:

"H. V. R. Thorne, Superintendent of Construction, has been associated with big construction in this country and Spain and with J. G. White Company in Mexico. He has energetically followed the construction details from the beginning of construction."

We apologize to both Mr. Thorne and to Mr. Moore for this omission.

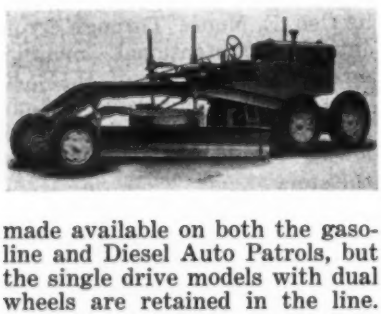
EQUIPMENT
You Ought to Know About

Caterpillar Reports Increased Sales of New Diesel Models

THE YEAR 1934 brought many important announcements from Caterpillar Tractor Company, most of them concerned with the further application of its Diesel engines to Caterpillar products and those of other manufacturers.

Recently, the Diesel Forty tractor was introduced to succeed the Diesel Thirty-Five. This new model has all the features that proved so popular in its predecessor, plus the advantages of greater power and increased strength.

The Diesel Auto Patrol was announced during the year, bringing the great economy of an engine which burns low-priced fuel oil to all classes of road maintenance work. Tandem drive was



made available on both the gasoline and Diesel Auto Patrols, but the single drive models with dual wheels are retained in the line.

Full power control was announced for the two largest Caterpillar blade graders and a new terracer was introduced which has been widely used in erosion control work.

The new Caterpillar elevating graders feature full power control of every operating adjustment of the plow and carrier. Power control levers, driven by the engine on the grader or tractor, are grouped within easy reach of the operator as he sits in an upholstered seat directly above the plow. An arched frame permits raising the carrier to a high position for loading large wagons, and a special bolster construction permits extremely short turns. A shaft-driven carrier operates a 48-inch belt. Both power take-off and engine-mounted models are available. In the latter machine, the engine is placed on a sub-frame at the left side of the rear axle to balance the weight of the carrier, lower the center of gravity, and remove the operator from the fumes of the engine.

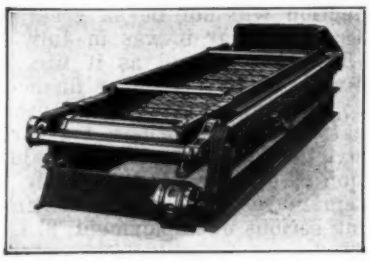
Two new Caterpillar Diesel power-units have been announced recently, the 6-cylinder D 13,000 engine developing 130 brake H.P. and the 4-cylinder D 8800 developing 80 brake H.P.

During the year many additions were made to the list of manufacturers who have adopted Caterpillar engines to power their machines. The manufacturer states that its engines have been powered into the excavators of the thirteen largest manufacturers of this type of equipment, and five out of the seven largest compressor manufacturers are now featuring Caterpillar Diesels. The list also includes prominent builders of industrial locomotives, crushers, gravel handling equipment, mining machinery and generators.

The company reports a nine to one preference for Diesel models among its agricultural and industrial users. During 1934, it manufactured a total of 237,314 horsepower in Diesel engines as compared with 107,933 horsepower in 1933 and 12,496 horsepower in 1932.

New Screen Has Unusual Action

A NEW Symons Screen was recently announced by the Nordberg Manufacturing Company of Milwaukee, Wisconsin, to be furnished with or without electric motor, and arranged for any required form of drive. These new screens are applicable for screening coal, gravel, sand, stone, ore, coke, slag, etc., and can be installed in permanent or portable plants. According to the announcement, an unusual action, which is a combination of conveying and screening, makes it possible to install the screen flat and thus require less head room and avoid bouncing or cascading of material along the deck to interfere with close grading. All moving parts are carried on flexible supports, which prevents vibration, further eliminated by the counterbalancing effect of the decks. The new Symons Screens are built with single, double, or triple decks, in lengths up to 30 feet and widths of 36″, 42″ and 48″. Different sizes require horsepower varying from 3 to 7½. Screen cloths are set in readily removable panels and may be obtained in any required size.



Complete information regarding the equipment mentioned on this page may be had by writing the manufacturers. We will appreciate your mentioning EXCAVATING ENGINEER.

A New Giant Stripper

A NEW STRIPPING shovel, with dippers up to 22 cubic yards and a working weight of 2,400,000 lbs., was recently announced by Bucyrus-Erie Company of South Milwaukee, Wisconsin. Unusual in output capacity and working ranges, the 950-B is readily convertible to shovel or dragline operation, and has the fastest digging cycle yet offered in machines of its class. It is available with booms up to 110 feet in length, with dipper handles up to 70 feet long, and with dippers of 14 to 22 cubic yard capacities—as may be required to suit pit conditions.

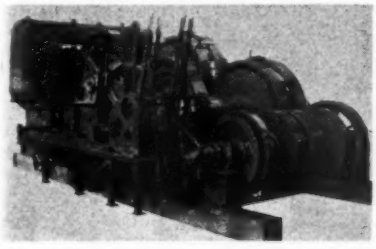
Many features combine to give this big stripper an outstanding ability to move overburden rapidly, continuously, and economically. Individual motors on each of the four caterpillar units give variable speeds for turning, which is still further simplified by hydraulic steering, minimizing slewing of units and skidding of belts. Savings in output time result from hydraulic leveling — while the machine is digging. The front end of the shovel is immensely strong, yet unhampered by cumbersome unnecessary weight.

Added steadiness is given the dipper by twin, single-part hoists. Power peaks are reduced by Bucyrus-Erie counterbalanced hoist.

These and many other unusual, practical features make the new 950-B as sound in detail as it is impressive in the whole.

New Four-Drum Clyde Hoist

A NEW four-drum erectors' hoist with either gasoline or electric power is among the 1934 developments of the Clyde Iron Works of Duluth, Minn. This three-speed, heavy duty hoist may be powered by an engine up to 200 H.P., the manufacturer states, giving in low speed, for example, a single line



pull of 21,000 lbs. at 200-foot line speed, in intermediate, 10,000 lbs. at 400 feet and in high, 5,000 lbs. at 800 f.p.m. The four drums are independently operated and each may handle an entirely different lifting job.

All shafts and drums are provided with ball or roller bearings. All shafting is unusually heavy, to withstand the strain of suspended loads on possibly three of the drums while the fourth is in active hoisting service. Frictions on the two main drums are of the internal expanding two piece band type and are engaged through a system of planetary gearing, giving extreme ease of control. The two auxiliary drums have double cone frictions with the customary screw thrusts. An additional feature is the patented automatic mechanical non-back-up brake which acts in case of power failure. All operations are controlled from a conveniently located lever bank.

Haiss Adds to Loader Line

A NEW development of Geo. Haiss Mfg. Co., Inc., 141st Street and Park Avenue, New York City, is the Model 135 Loader. This machine is caterpillar mounted, is equipped with patented feeding propellers, and has an exclusive slow speed crowding drive that allows the machine to dig into the pile at the rate of three or four feet a minute. The machine weighs 20,000 pounds when equipped with 65 H.P. gasoline engine. All gears and clutches are enclosed and run in oil. Buckets are 36″ long and 13″ wide reinforced with cutting lips. The sprockets and chain are manganese. Only one man is required to operate the machine as all the handles and levers are placed in a convenient position on a platform. According to the manufacturer this loader has a capacity of five yards a minute in such material as sand, gravel, crushed stone, cinders, etc., and will handle any loose material weighing up to 165 lbs. per cubic foot, and where the largest lump will pass through a 6″ ring.

Complete information regarding the equipment mentioned on this page may be had by writing the manufacturers. We will appreciate your mentioning EXCAVATING ENGINEER.

Improvements in design and construction have been made to the Haiss lines of portable conveyors and clamshell buckets. Rubber lagged head pulley, Timken tail pulleys and overhead raising and lowering device are among the improvements to the conveyor line.

The illustration above shows the conveyor mounted on the turntable platform on a Rex concrete paver. This belt conveys the wet concrete from the mixer to the forms and saves considerable time over the previous method. This conveyor can pivot on a turntable pin to 180 degree swing and can be raised and lowered by means of the tackle which ordinarily holds the bucket rail. The conveyor is driven by means of a gasoline engine. Such conveyors have a capacity of one to three yards per minute in handling wet concrete.

The latest development of Haiss HiPower Buckets has jaws of heavy construction and a new lower sheave casting so designed that any material that falls on the sheaves will not be locked or contained in the casting but on account of the top contour falls off into the bowl of the bucket. The manufacturer states that the construction of this bucket is such as to give very great digging power without surplus weight. All the bearings, pins, sheaves, etc., are longer and well equipped with grease holes in high pressure Zerk lubricating system which means longer life and greater utility. All shafts, pins, etc., are of nickel steel and of large diameter.

New Linn Tractor for Snow Removal

THE LINN Manufacturing Corporation, Morris, N. Y., has just announced a new high-speed, heavy-duty model of their flexible traction-type truck tractor, known as Model 6H-33, for snow plowing service. It was designed to fill the need for a unit capable of plowing deep snow at a high rate of speed, and provide the advantage of high speed for return trips.

The top speed of Model 6H-33 is announced as 12 M.P.H. Tests have proved that it will plow two feet of snow at this high rate of

(Continued on Page 54)

SHOTS *from the Firing Line*

Road Builders' Program

ONE OF THE outstanding events in the highway industry during the month of January will be the 32nd Annual Convention of the American Road Builders Association at Washington, D. C., January 22, 23, 24 and 25. Convention headquarters will be at the Willard Hotel.

The theme of the convention will be: continuation of an adequate highway program; the use of highway revenues for highway purposes—no diversions; and the continuation of Federal appropriations for highway construction.

Among the many interesting talks to be given during the two general open sessions Tuesday and Thursday will be: "The Highway Situation," by H. C. Whitehurst, President, American Road Builders' Association; "Broadening the Highway Program," by Thomas H. McDonald, Chief, Bureau of Public Roads; "Continuation of an Adequate and Economic Highway Program," by Arthur W. Brandt, President, American Association of State Highway Officials; "Highway Progress," by Wilburn Cartwright, U. S. Representative from Oklahoma; "Report on Study of Conservation of Gasoline Tax and Motor Vehicle License Revenues for Highways," by Charles M. Upham, Engineer-Director, American Road Builders' Association; and "Roads and the Rural Letter Carrier," by Wm. G. Armstrong, President, National Rural Letter Carriers' Association.

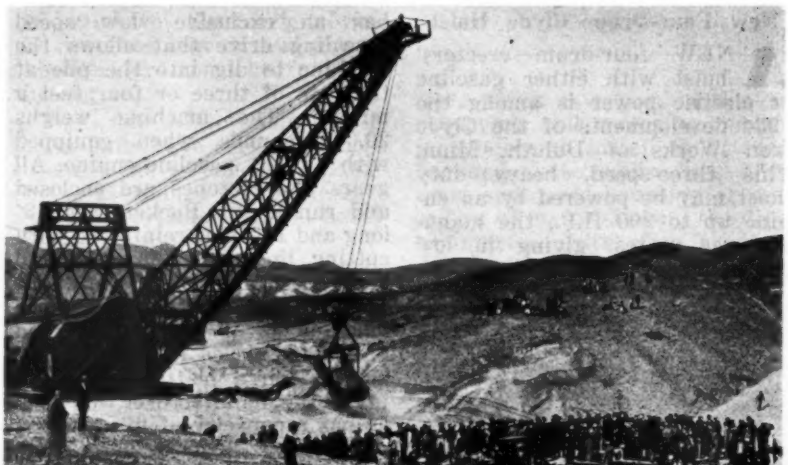
Besides the two general sessions to deal with the general subjects, there will be sessions of the County Highway Officials' Division, City Officials' Division, Highway Contractors' Division and Engineers' and Officials Division, to present and consider subjects directly applicable to these divisions.

Work on 500-Mile National Parkway Well Under Way

WITH WORK on one project completed except for paving and that on a second project well under way and expected to be completed by mid-1935, a 64.5-mile start has been made on the 500-mile scenic parkway which the Government is constructing, at a cost of approximately $16,000,000 through Virginia, North Carolina and Tennessee to connect up its two newest national park areas . . . the Shenandoah Valley and the Great Smoky Mountains National Parks, the first of which is in Virginia and the second in Tennessee and North Carolina.

Of this mileage, the portion from Thornton's Gap to Swift Run Gap, a distance of 34 miles, has been completed, except for surfacing, the work being done under the supervision of engineers from the Federal Bureau of Public Roads, with headquarters at Luray, Va. Contracts for another 30 miles, from Thornton's Gap to Front Royal, Va., have been let in three sections, and a third project is soon to be let for that part of the parkway between Swift Run Gap and Jarman's Gap, at the entrance to the Shenandoah National Park. The two projects upon which work has gotten under way have a combined cost of $1,537,000 and have given employment to approximately 1,500 men.

Project No. 2, now under construction, is divided into three sections, Section A, from Front Royal to Compton's Gap, a distance of 9.76 miles, is being built by the Waugh Brothers Construction Company of Fayetteville, W. Va., with Vice-President M. A. Waugh and General Superintendent F. B. Daniels on the job. Section B, consisting of 10.4 miles from Compton's Gap to Hogback Mountain, has been let to the Sammons-Robertson Company, Inc., of Huntington, W. Va. F. W. Robertson, Vice-president and Treasurer of the company, is superintending the concrete bridge work on this section of the project, and L. M. Henry, Superintendent of the company, is handling the road construction work in this important sector of the Skyline Parkway front. While the contract for Section C, comprising 10.23 miles from Hogback Mountain to Thornton's Gap, is in the capable hands of Alfred Brothers, Inc., of Salem, Va.



—KEYSTONE PHOTO

Work Starts on Dirt Section of All-American Canal

DEDICATION ceremonies marked the start of work December 16, on the $33,000,000 All-American Canal which will carry water from the Colorado River to the Imperial and Coachella Valleys. Shown here is a Bucyrus-Monighan 10-W Diesel-powered walking dragline removing the first dipperful of dirt. Immediately behind it can be seen another machine of the same make and size.

W. E. Callahan Construction Company of St. Louis, R. Gunther and J. P. Shirley of Omaha hold the contract for the construction of the major portion of the canal. Boyce and Igo have subcontracted a portion of the work.

Sections one to six inclusive of the canal call for the excavation of 39,340,000 yards of dirt and 28,000 yards of rock, at a total cost of $4,859,587.

Griffith Company of Los Angeles is working on a 500,000-yard rock section of the canal near Yuma.

Fifty Manufacturers Participating in Big Machinery Show

EVERYONE interested in power equipment is invited to attend the machinery exhibit to be held in the display room of Caterpillar Tractor Company, at Peoria, Illinois, from January 8th to 20th, inclusive. The show is being held in connection with the International Caterpillar Reunion scheduled for January 8-9-10, but the general public is invited to inspect the equipment exhibit. Over fifty manufacturers are participating, and a half million

dollars worth of machinery will be on display, including the latest developments in contracting, road building, agricultural, logging, and oilfield machinery. Special factory trips and free talking pictures will be additional features of the exhibit.

First Units of Aqueduct Distribution System Awarded

By J. R. MARCY

ELEVEN BIDS from contractors for the construction of ten miles of tunnels in the distributing system of the Aqueduct were opened December 17 by the district. This marks the first step in the system that will deliver the water from the terminus of the main aqueduct, Cajalco Reservoir, to the thirteen Southern California cities which make up the Metropolitan Water District. The bidding was on four projects; Monrovia tunnels Nos. 1, 2, and 3, totaling more than seven miles in length, and the Pasadena tunnel, two and one-third miles.

West Construction Company, holders of the contract for the Whitewater bores on the main aqueduct line, were the low bidders on the Monrovia tunnels, offering a price of $528,100 for Nos. 1 and 2, and $1,782,400 for No. 3.

The firm of L. E. Dixon, Bent Brothers, and Johnson, (the Dixon and Bent part of the firm hold the contract for the West end of the West Eagle Mountain tunnel) were low on the Pasadena tunnel with a bid of $621,180.

The four tunnels, 10 feet in diameter, concrete lined and reinforced where necessary, involve 272,000 yards of tunnel excavation, approximately 5,000 yards of approach cut excavation, 110,000 yards of concrete, 16,000,000 pounds of steel, 1,550,000 board feet of timber, and 184,000 barrels of cement. The entire distribution system, including this first project, will be carried forward under the supervision of R. B. Diemer, distribution engineer of the District.

Ohio Gas Tax Diversions for Relief Held Unconstitutional

A LAW DIVERTING part of the Ohio state gas tax revenues for poor relief has been held unconstitutional by the State Supreme Court in a ruling which states that the legislature failed to recognize poor relief diversion from the gas tax fund when it reenacted the state gas tax law, reducing the levy for highway purposes from 2 to 1½ cents per gallon; the additional half cent was diverted to aid schools, but no provision was made in the law for diversion for relief.

The recent poor relief diversion statute was questioned as to legality in a taxpayer's suit, asking an injunction against the diversion. The Ohio Supreme Court sustained the lower court in its finding that there was no authority in existing law for diversion of the revenue for relief work.

Pumpcrete Speeds Pouring on Aqueduct Test

By JOHN R. MARCY

EXCAVATING ENGINEER for September described the Pumpcrete installation on Lock No. 8 in the Upper Mississippi. A recently completed job on the Colorado River Aqueduct provides another example of the use of such equipment in concrete pouring.

The Aqueduct job was a section of monolithic siphon, 12 feet in diameter, poured at Fan Hill as a test against a similar section of precast siphon installed at Little Morongo. Pumpcrete equipment was used to speed the pouring.

One of the chief advantages of the equipment lay in the fact that the pipe line from the mixing and pumping plant could be swung to any point to follow the work, the plant remaining at the same place throughout the job. A flexible spout at the siphon end was tried first, and was later replaced with adjustable pipes and concrete buggies, found to be more satisfactory in the placing of the concrete.

During and after construction careful tests were conducted in an attempt to decide which type, monolithic or precast, would be better for the balance of the Aqueduct siphon sections. Five instruments were set in the conduit ined pressure gauges to determine the load on the sub-grade, gauge points vert during the pouring. These included pressure gauges to determine the load on the sub-grade, gauge points for measuring elastic deformations and settlement of points on the surface of the invert, strain meters for measuring the stresses at critical points, joint meters to indicate the amount the opening that might occur in the joint between the arch and invert, and thermocouples for temperature measurements. The tests showed that either type of conduit construction would be satisfactory, but later bids on additional work seem to indicate that the monolithic is far cheaper.

Progress on Public Works Highways to December 15, 1934

PROGRESS MADE on emergency construction of public works highways to December 15 under the supervision of the U. S. Bureau of Public Roads shows a total of 563 projects, estimated to cost $28,156,000, approved but contracts not yet awarded; 637 projects, estimated to cost $24,649,000, awarded but not yet under construction; 2,562 projects, estimated to cost $155,884,000, under construction; and 7,060 projects completed at a cost of approximately $306,387,000. The 2,562 projects under construction involve 7,260 miles of road and are giving regular direct employment to 117,088 men.

Aggregate Associations Will Hold Conventions in Chicago

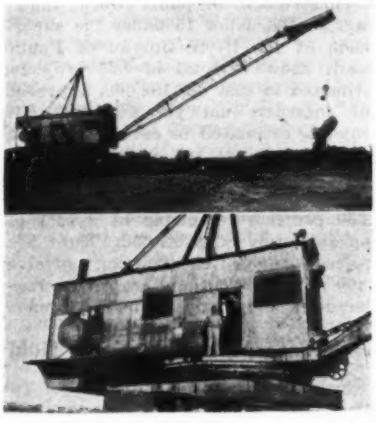
DURING the week of January 28, 1935, at the Palmer House, Chicago there will be held the annual conventions of the National Sand and Gravel Association, the National Crushed Stone Association and the National Slag Association; the annual

meeting of the Code Authority for the Crushed Stone, Sand and Gravel and Slag Industries; a meeting for all members of the three industries for a free and open discussion of the Code; and a renewal (after a year's interruption) of the Machinery Exposition by the Manufacturers Divisions of the Sand and Gravel and the Crushed Stone Associations. In addition, the National Ready Mixed Concrete Association and the Code Authority for that industry will meet on Thursday, Friday, and Saturday of the same week. The week includes events which no member of these industries can afford to miss.

Foreign Notes

Australia

From New South Wales come these snapshots of a Bucyrus-Erie Class 20 steam dragline sent to us by operator W. J. Atkins. He writes that the machine is working on a 6-mile section of the **Wakool Channel** near Deniliquin. The channel is 31 feet wide at the bottom and 65 at the top with the depth averaging 7 feet 6 inches. The dragline digs from the center and dumps to each side and is followed by a 1-yard Ransomes-Rapier-Marion dragline which completes the side slopes.



Shown in the picture above are Mr. Atkins and W. O'Brien.

New England Notes

By E. D. COOGAN

Arthur A. Johnson, Inc. of Long Island City, New York was low with a bid of $1,446,755 on the Quabbin Dike job for the Boston Metropolitan Water Commission. One item on the job is 2,100,000 yards of borrow.

The Eastern Contracting Company is making excellent progress on the approaches to the Bourne bridge over the Cape Cod Canal. The dredge "Crest" is working in the canal and can be seen from the bridge.

V. Barletta Company have practically completed their highway job at Cooleyville, Mass., and are now concentrating their efforts on the Fore River bridge at Quincy, Mass.

C. A. Crowley of Milton, Mass. has kept his Bucyrus-Erie 16-B busy practically all season. We wish him the best of luck for 1935.

Altieri Construction Company of Waterbury, Conn., submitted low bid December 10 for the construction of 2.3 miles of macadam pavement and 10-foot bridge near Hampton, Conn., for $76,523.

We expect that from now on the best place to locate a large percentage of the New England contractors will be in the **warmer climes**. Here's hoping they all enjoy a well earned rest and a pleasant vacation.

New York Notes

At a highway letting held December 4 by the Department of Public Works, the following low bids were received: **O'Day & Ambrose, Inc.**, of Birmingham, $47,430 for a 5.1-mile road project in Delaware County; **Ellis G. De Lia & Company** of New Hartford, $63,558 for 4.2 miles of paving in Schoharie County; **Spellman Oliver Company** of Chateaugay, $69,044 for 3.34 miles of paving in Clinton County; **Madison County Construction Company, Inc.**, of Solsville, $288,418 for 7.5 miles of paving in Albany and Schenectady Counties; **New York & New Jersey Engineering Corporation** of New York City, $412,064 for .82 mile of road construction in Kings and Queens Counties; and **Johnson, Drake & Piper, Inc.**, of Freeport, $149,324 for 2.63 miles of paving in Ulster County.

Rodgers and Hagerty of New York City were low December 4 with a bid of $362,450 for the construction of Randalls Island and Little Hell Gate Piers of the Triborough Bridge.

Pennsylvania Notes

At a recent letting the following low bids were received by the Highway Commission: for paving 3.4 miles in Beaver County, $80,473, from **H. A. McBurney** of Pittsburgh; for paving 4.3 miles in Beaver and Washington Counties, $77,046, from **John Kirch & Sons** of Pittsburgh; for 1.3 miles paving dual highway in Pike County, $76,011, from **F. D. Kessler, Inc.** of Northumberland; for 1.1 mile paving in Somerset County, $65,337, from **A. C. Rothey** of Elizabeth; for .87 miles of paving in Luzerne County, $99,412, from **Central Pennsylvania Quarry, Stripping and Construction Company** of Hazleton; for 1.4 miles of widening in Lehigh County, $41,006, from **General Paving Company** of Allentown; for 1.2 miles of widening in Lehigh County, $58,578, from **W. M. Mumma** of Harrisburg; for 1 mile of brick on concrete, $120,977, from **McGrady Construction Company** of Pittsburgh; and for 1 mile of paving in Beaver County, $64,718, from **Harrison Construction Company** of Pittsburgh.

South Carolina Notes

At a letting held December 13 the following low bids were received by the State Highway Commission; for 3.5 miles of grading and surfacing in Saluda and Aiken Counties, $40,551, and for 6.5 miles of grading in Dillon County, $37,617, from **E. W. Grannis** of Fayetteville; and for 5.4 miles of grading and surfacing in Oconee County, $58,770, from **W. C. Shepherd** of Atlanta, Georgia.

Georgia Notes

The State Highway Board received the following low bids December 21: for 5.8 miles of surfacing in Appling County, $74,762, for 4 miles of surfacing in Pulaski County, $47,354, and for 7.97 miles of paving in Wheeler County, $103,985, all from **Manly Construction Company** of Ocala, Florida; for 2.5 miles of surfacing in Bryan County, $48,018, and for 3.5 miles of concrete paving in Twiggs County, $87,299, both from **Espy Paving & Construction Company** of Savannah; for 4.8 miles of grading and 2 culverts in Cobb County, $96,857, and for 3.8 miles of grading in Fulton County, $73,653, both from **E. A. Hudson's Sons** of Bolton; for 5.1 miles of grading in De Kalb County, $57,552, from **W. L. Florence Construction Company** of Powder Springs; for 5.2 miles of concrete paving in Gwinnett County, $104,826, from **Ballenger Paving Company** of Greenville, S. C.; and for seven bridge projects, $309,992 (total), from **Austin Brothers Bridge Company** of Atlanta.

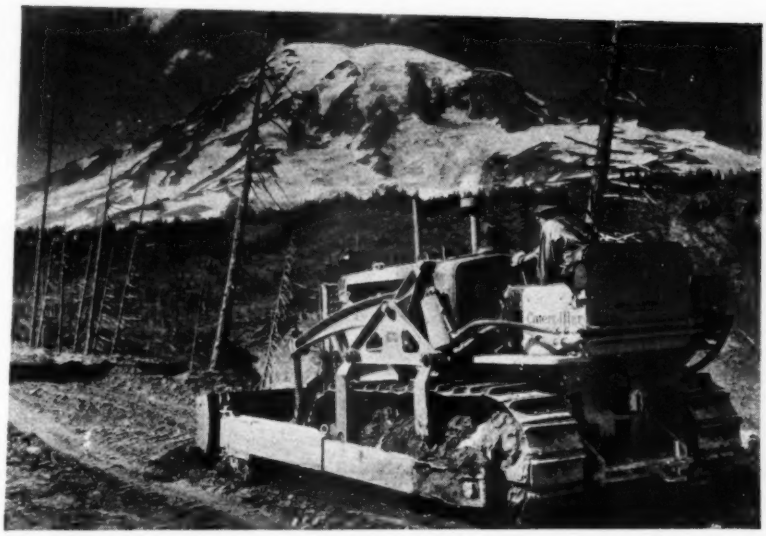
Florida Notes

Smith Engineering & Construction Company of Pensacola was low with a bid of $121,858 for paving 7.57 miles in Walton County.

PWA recently made an allotment of $520,000 to Miami to be used in improving the harbor by widening and dredging.

Indiana Notes

The State Highway Commission received the following low bids November 27; for 7 miles of concrete paving in Jackson County, $157,018, from **Vinton Construction Company** of Fort Wayne; for 6.5 miles of concrete paving in Harrison County, $130,798, from **Robinson Gregory & Company** and **Hart & Hart** of Columbus; for 7.7 miles of concrete paving in De Kalb and Noble Counties, $179,307, from **Brand & Deal** of Columbia City; for 9.1 miles of concrete paving in Greene and Owen Counties, $185,327, from **Gast Construction Company** of Warsaw; for 18.5 miles of surfacing in Harrison and Warwick Counties, $155,176 from **R. Rogers & Company** of Bloomington; for 4.2 miles of concrete paving in Harrison County, $98,629, from **Meshberger Brothers Stone Company** of Linn



The Colonial Construction Co., of Spokane, Washington, uses "Caterpillar" Diesel power in the construction of a new scenic highway in Rainier National Park.

On a fuel cost of less than a dollar a day, Amador County does road maintenance work with this "Caterpillar" Diesel Tractor near Jackson, California.

"THE 'CATERPILLAR' DIESEL TRACTOR HAS CUT OUR FUEL COSTS 70%"

—SAYS A COUNTY SUPERVISOR WHOSE ROAD WORK WAS FORMERLY DONE WITH A GASOLINE TRACTOR. OTHER OWNERS, EVERYWHERE, REPORT SIMILAR SAVINGS

"It costs only half as much to fill the fuel tank, and a tankful lasts twice as long"—"Fuel for our tractor costs less than food for the driver"—"Our big 'Caterpillar' Diesel costs less for fuel than three smaller gasoline tractors" . . . these are terms in which owners express their delight over the economy of the "Caterpillar" Diesel. For their economy—plus rugged power, sure traction and faithful performance—"Caterpillar" Diesel Tractors have won a foremost place on today's earth-moving, contracting, road-building jobs. They can reduce your power costs. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

AMERICA GOES DIESEL

For your convenience in writing to Caterpillar Tractor Co., you will find a card bound in this issue.

Shots From the Firing Line—*Continued*

Grove; for 8.2 miles of concrete paving in Owen County $202,121, from **Middle West Roads Company** of Indianapolis; and for 20.2 miles of concrete paving in Clay and Owen Counties $160,000, from **Clark, Duvall & Sparling** of Flora.

Illinois Notes

Arcole Construction Company of Niles Center received award recently to construct a bridge and 2.2 miles of concrete pavement in Cook County for a total of $155,793.

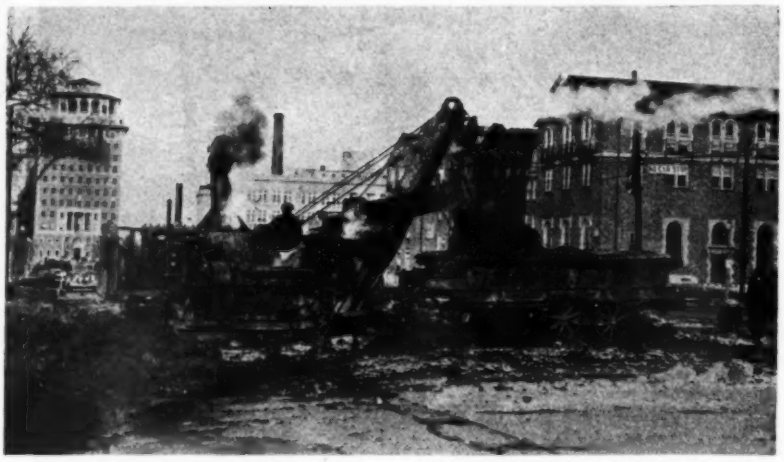
At a letting held at Springfield December 12, the following low bids were received: for 2.5 miles of paving in Crawford County, $117,324, from **Granite Bituminous Paving Company** of St. Louis; for 2 miles of paving in Cook County and 2.9 miles of retread paving in Jersey County, $68,625 and $49,743, from **Stanley Jaicks** of Winfield; for 5.47 miles of paving in Fulton County, $155,658, from **Hartmann-Clark Brothers Company** of Peoria; for 5.4 miles of paving in Fulton County, $109,859, from **A. J. Shanks Construction Company of Watseka**; for 5.18 miles of paving in Fulton County and 8.37 miles in Pike County, $122,363 and $212,227, from **Birt Brothers** of Decatur; for 6.96 miles of paving in Pike County, $192,518, from **Hurden Construction Company** of Springfield; for 8.13 miles of paving in Pike County and 7.1 miles in Adams County, $194,040 and $185,001 from **Dungey and Cochran** of Marion; for 7.7 miles of paving in Adams-Pike County, $238,588, from **R. P. Devine** of Watseka; and for 5 miles of paving in Edwards-Wabash Counties, $35,468, from **Harrelson and Johnson** of Harrisburg.

PWA has alloted $209,000 to the state for **road construction** including grade separations and bridges.

Wisconsin Notes

At a recent letting held by the State Highway Commission, the following low bids were received; for 2.1 miles of grading in Buffalo County, $83,641, and for 7.41 miles of grading in Trempealeau County, $85,243, both from **Griffiths Brothers Construction Company** of St. Paul; for 2 bridges in Buffalo County, $51,109, from **Milwaukee Bridge Company** of Milwaukee; and for 13.4 miles of concrete surfacing in Burnett County, $174,635, from **J. P. Humphries** of Milwaukee.

The State Highway Commission announced recently that the **twenty-fourth Annual Road School** for staff, county, municipal and township highway officials will be held at Madison Jan. 22, 23 and 24. In addition to general sessions on administration, design, materials and maintenance of roads, sectional meetings for county officials will be held.



St. Louis and Vicinity

By A. J. KOENIG

The U. S. Engineers at St. Louis will take bids late in January or early in February for the construction of a reinforced **concrete dam** across the Mississippi River and necessary bank protection work on right bank of river in connection with Lock No. 26.

W. A. Riley Inc. of St. Louis has contract for installing 16,000 lin. ft. 4 to 12-inch cast iron pipe, connections, fire hydrants, gate valves, etc. at Bolivar, Mo.

The Board of Public Service plans the **separation of grades** at Kings Highway and Missouri Pacific Railroad tracks. The present plan calls for elevating the tracks eleven feet above the present level of the street.

Shown above is **Fruin-Colnon Contracting Company's** Bucyrus-Erie E-2 Diesel crane placing the concrete for the Hampton Avenue overpass which is being built in the park just north of Oakland Avenue. A Rex 27-E paver on the high bank to the right of the picture shoots the cement down to the skip which the E-2 swings to the opposite foundation. This overpass is one of several crossing the new Express Highway being built around the city and will be of concrete and steel construction.

Tony McNamee is making a cut through Kings Highway just north of Chouteau Avenue for a 30-foot underpass, with his Bucyrus-Erie 41-B steam shovel. This underpass is on the same Express Highway as Fruin-Colnon's E-2 Diesel mentioned before. There are 110,000 yards of excavation on the McNamee section. Six Caterpillar 60's with 7-yard Western crawler-mounted wagons haul the dirt some 2,000 feet where it is dumped into a creek bottom. At first the pulling was tough due to the soft ground at the dumping end but the Caterpillar 60's handled this problem in their usual fashion.

Bids for the paving of two sections of the newly created River des Peres Parkway were recently opened by the Board of Public Service. The Parkway, which parallels the River des Peres drainage works and provides a new thoroughfare to the extreme southern portion of the city, will be paved with reinforced concrete slab 24 ft. wide. **Perkinson Bros. Construction Co.** was low on the section from Morganford to Loughborough avenues with a bid of $125,023. **Stiers Bros. Construction Co.** was low on the section from Loughborough to Landsdowne with a bid of $101,825.

River Notes

Rock Island District

Central Engineering Company of Davenport, Iowa, received an award to construct Dam No. 16 on the Mississippi near Muscatine, Iowa, for $2,053,130.

Memphis District

At a letting held December 7, **Driver Company** of Memphis submitted low bid of 14.2c on 2,273,000 yards of earthwork in the White River Levee.

New Orleans District

John L. McWilliams, New Orleans, was low November 30, with a bid of 9.9c per yard for constructing a drainage canal above Bonnet Carre Floodway Upper Guide Levee, involving 154,000 yards of excavation.

What Job Tomorrow?

THE Walker is a ***versatile*** excavating machine. On one job, it's constructing levees; on another it's stripping overburden; excavating for a mammoth sewer; digging and loading gravel; or changing the age-old course of a river.

No delays for uncertain footing or tedious maneuvering—it's the ***walking dragline!*** But don't let that minimize the fact that the Bucyrus-Monighan has won its reputation because of its GREAT DIGGING performance, turning in amazing yardage records at surprisingly low cost. Bucyrus-Monighan Company, Chicago, Ill.

● Representatives throughout the U.S.A. Branch Offices: Boston, New York, Philadelphia, Birmingham, Pittsburgh, Chicago, St. Louis, Kansas City, Dallas, San Francisco. Offices or Distributors throughout the world.

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BUCYRUS MONIGHAN

Walking Draglines 1 to 10 cubic yards

B-63

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Shots From the Firing Line— *Continued*

Dameron and Kenyon of Port Allen, La., submitted low bid of 10.98c per yard December 17 for constructing the 1,160,000-yard Palmetto - Courtableau Levee.

L. E. Harris of Ferriday, La., was low December 18 with a bid of 13.75c per yard for constructing the 1,100,-000-yard Henderson-Catahoula Levee.

McWilliams Dredging Company of New Orleans submitted low bid December 19 of 16.47c per yard for the construction of the 3,300,000-yard (4 sections) Catahoula-Dauterive Levee.

L. F. Alexander Company, Inc. of New Orleans was low December 27 with a bid of $117,652 for constructing 2,570 feet of spur dikes and 5,000 square yards of willow mat.

Bids will be received January 22 for the construction of four sections of the East Atchafalaya Basin Protection Levee involving **3,100,000 yards of earthwork.** The work is located in Iberville Parish approximately ten miles west of Plaquemine, La.

Missouri Notes

Henderson Construction Company of Richmond was low with a bid of $62,-474 for grading 11.5 miles in Andrew County.

M. E. Gillioz of Monett was low bidder on 1.117 miles of concrete paving in Butler County with a figure of $66,509.

Oklahoma Notes

By L. W. GABEL

The State Highway Commission has announced the following awards: 10.2 miles of grading (2 projects) in Latimer County for $43,122, and 3.4 miles of grading in Harper and Woods Counties for $35,169, all to **T. C. Ottinger** of Hinton; 3 miles of grading and paving in Cotton County for $82,895 and .5 miles paving in Walters for $18,822, both to **S. O. Maxey and Company** of Durant; 3 miles grading and paving in Jackson County for $77,219, and 3.5 miles of paving in Harmon County for $87,187 to **Park-Ward Company** of Oklahoma City; .65 miles of paving in Harmon County for $36,768 to **L. S. Fisher Construction Company** of Woodward; and a bridge over the Cimarron River between Harper and Woods Counties for $112,978 to **R. R. Tway** of Oklahoma City.

List & Weatherly Construction Company submitted low bid of $166,274 for the construction of a bridge over the Arkansas River between Pawnee and Osage Counties.

Texas Notes

By L. W. GABEL

The State Highway Commission has recently made the following awards: **Combs & Glade** of Wichita Falls, 7.7 miles of concrete paving in Collingsworth County for $148,000; **Union Construction Company** of Dallas, 15.1 miles of concrete paving in Brazos County, for $291,463 and .7 mile paving on Highway 24 near Cooper, Delta County, for $24,876; **Harrison Engineering & Construction Corporation** of Kansas City, 14.9 miles concrete paving in Fort Bend County on Highway 38 for $282,763; **C. W. Hobson** of Dallas, 9 miles concrete, Highway 71, Colorado County, for $157,907; **Atmar-Nickerbocker Inc.** of San Antonio, 7.5 miles caliche base course and asphalt on Highway 3, Presidio County, for $75,770; **H. B. Zachary Company** of Laredo, 11.8 miles of surfacing on Highway 3 in Brewster County for $75,917; **E. F. Bucy & Sons** and **C. T. Childs** of Rising Star, 5.7 miles of grading, drainage structures and surfacing, Highway 206, Eastland County, for $46,847, and 10.3 miles of grading and culverts in Irion County for $102,792; **W. A. Rawls** of El Paso, 7.6 miles of grading and surfacing in Ward County for $91,472; **McKnight Company of Amarillo,** 13 miles grading and drainage structures; Highway 5, in Donaly County, for $54,901; **L. J. Miles** of Fort Worth, 9 miles of grading and drainage structures, Highway 1, Hudspeth County, for $58,771; **T. M. Brown and Son,** of Brownswood, 10.9 miles grading and drainage, Highway 5, Donley County, for $69,046; **Womack-Hanning Construction Company,** 15.7 miles grading and drainage structures, Highway 5, Montague County, for $119,020, and 5.7 miles of grading in Clay County for $25,967; **Buckner Bros.** of Cleburne, 3.1 miles of grading and drainage structures, Highway 22, Rusk County, for $33,812; **Word & Worrell** of San Antonio, 5.8 miles of grading and drainage structures, Highway 2, Hayes County, for $52,125; and **Gifford-Hill & Company, Inc.** of Dallas, 12.1 miles grading and drainage structures on Highway 15, Harrison County, for $141,288.

Austin Bridge Company of Dallas was low December 6 with a bid of $100,960 for the construction of a seawall, pier, and breakwater at Palacois.

Nebraska Notes

P. Kiewit Sons and **G. W. Condon Company** of Omaha were low November 22 with a bid of $462,509 for the construction of a reservoir and canal, which are a part of the Loup River power project being built by the Loup River Public Power District near Columbus.

Colorado Notes

By H. M. BIBAUD

A new route cutting more than 7 miles from the distance between Denver and Idaho Springs is one of the major projects proposed by the State Highway Department's **5-million dollar budget** for 1935. Instead of the present winding but scenic highway, a direct water grade road will be built up Clear Creek canyon from Golden, following the present route of the Colorado and Southern railroad. The cost is estimated at approximately one million dollars.

Bids on two highway projects were opened recently by the U. S. Bureau of Public Roads; the **Pioneer Construction and Engineering Company** of Denver submitted low bid of $81,859 for 3 miles of heavy grading on the Black Mesa forest highway near Gunnison; and the **Dudley Stone Products Company** of El Paso was low with bid of $47,714 for 3 miles of surfacing and 5 miles of grading on the Corrizozo-Roswell highway near Capitan, New Mexico.

Engineering plans for the **Caddoa Dam project,** for which preliminary work has been planned, include the construction of a 120-foot embankment, approximately 14,000 feet in length, with a concrete spillway having a capacity of 130,000 second feet. The total cost of the project is estimated at about $9,000,000.

The Highway Advisory Board, meeting in Denver, November 19, authorized the Highway Maintenance Department to **resurface six miles** of Highway No. 19, south of Wilson Gulch.

Governor Johnson and the Highway Advisory Board have indicated that Highway No. 172 east of Ignacio be allocated for **permanent improvement.**

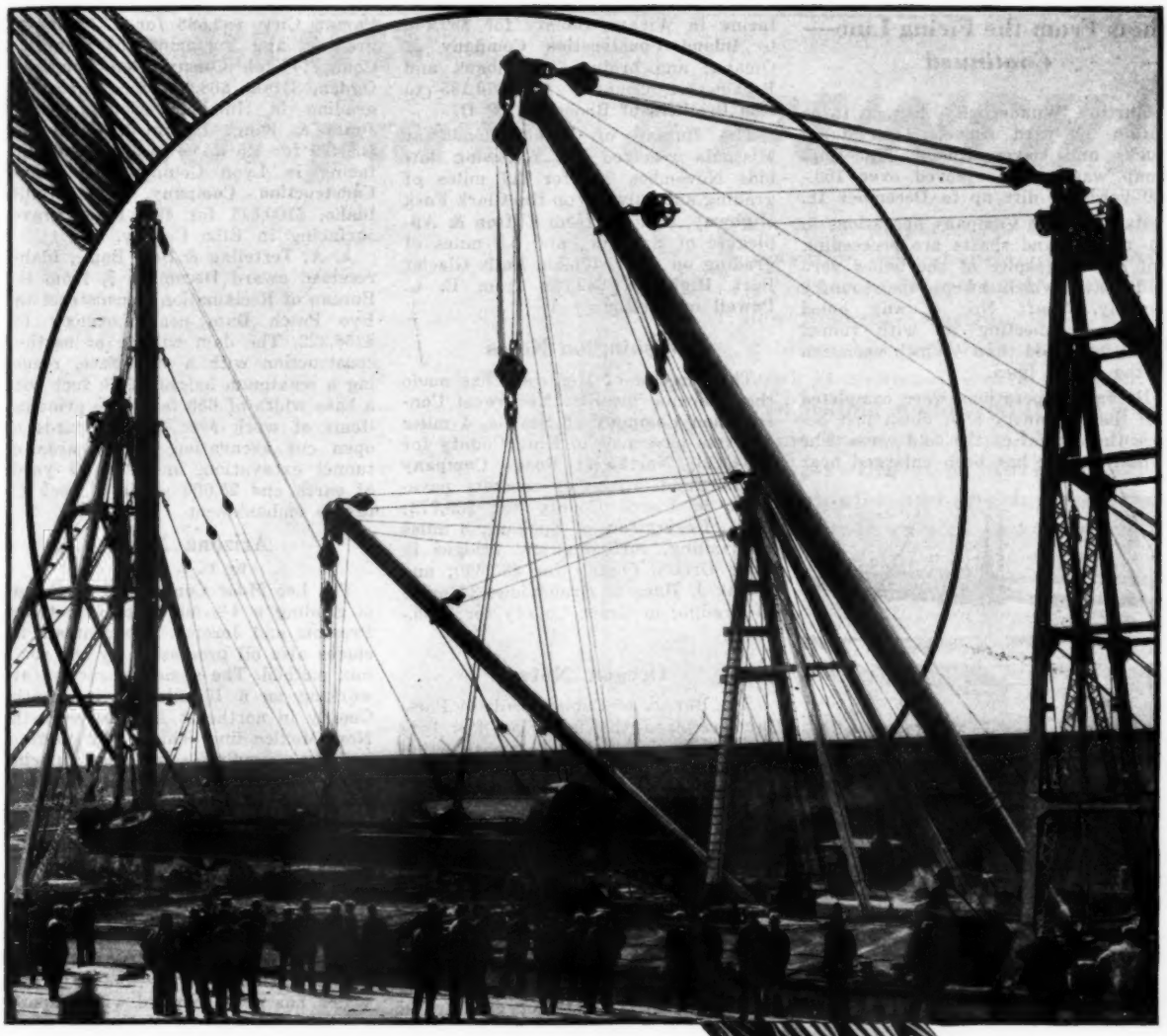
Construction will be started early in the spring on the $2,500,000 Taylor Park Dam in the Uncompahgre Valley, according to R. F. Walter, chief engineer of the U. S. Bureau of Reclamation. Invitations to bidders have been given and the bids scheduled to be opened February 18. The dam construction will be 31 miles northeast of Gunnison in Taylor River Canyon. A huge lake created by the Dam will supply supplemental water for the Uncompahgre Valley.

South Dakota Notes

The State Highway Commission has made the following awards on bids received November 23; 16 miles of grading in Dunn and Burleigh Counties for $41,402 to **Wm. Collins** of Fargo; 1.5 miles of grading and .5 miles of concrete paving for $67,849 to **Rue Brothers** of Bismarck; 5.2 miles of grading and surfacing in Ward County for $31,854 and 6.4 miles of grading and surfacing in Stutsman County for $10,-101 to **W. H. Noel Company** of Jamestown; and 53 miles of gravel surfacing in various counties for $54,682 to **Lyle Sloan** of Ellendale, Minnesota.

Fort Peck Dam Notes

Employment is being maintained at high levels despite the winter weather. On December 15, a total of **5,090 workers** were on the payrolls of contractors and the government, being divided about equally between the two.



PROOF
IS ONLY IN ACTUAL SERVICE

IT is one thing to talk about the ability of Wire Rope to "take it"—and it is quite another thing to prove exceptional ability by actual performance on the job. In every field of application—wherever the hardest of tasks are to be accomplished—the chances are you will find American Steel & Wire Company Wire Rope doing the work—doing it better—and more economically. This widespread preference is based on proved service records—and on the knowledge that no problem is so large or so small that our engineers will not welcome an opportunity to cooperate.

AMERICAN STEEL & WIRE COMPANY

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Offices in All Principal Cities

United States Steel Corporation Subsidiary

For your convenience in writing to American Steel & Wire Company, you will find a card bound in this issue.

Shots From the Firing Line— *Continued*

Martin Wunderlich, using three Lorain 1½-yard shovels, ten dump trucks and eleven Euclid Trac-Truk dump wagons, has moved over 163,000 yards of dirt up to December 18.

Mason-Walsh Company operations in the tunnels and shafts are proceeding full speed in spite of the below zero cold wave which swept the country recently. Shaft No. 4 was holed through, connecting up with tunnel No. 4 with less than ½ inch variation in the center lines.

Dredging operations were completed and the machinery shut down just before the arrival of the cold wave. The winter harbor has been enlarged near

the machine shop. During the winter shutdown, the government forces will continue with the installation of machinery on the other three dredges and the booster barges.

Spillway Builders, Inc., a construction unit of Massman Construction Company of Kansas City, are steadily increasing their yardage with the addition of shovels and other equipment. Two Bucyrus-Erie and two Lima shovels, all 2-yard machines, are at work. Trucking has been subcontracted by the **E. O. Dahlquist Company** and the **Connolly Contracting Company.**

Montana Notes

The following awards have been made recently by the State Highway Commission on bids received November 27: 13.8 miles of grading and surfacing in Broadwater County for $132,587 to **Hector Construction Company** of Hector and **Lobnitz Brothers, Inc.** of Wilmar; 12.8 miles of grading and surfacing in Judith Basin County for $90,635 to **Lawler Corporation** and **James E. Healen** of Butte; 5.5 miles of grading and surfacing in Rosebud County for $38,883 to **Prahl & Sawtell, Inc.** of Miles City; 6.5 miles of grading and surfacing in Meagher County for $70,553 to **E. L. McNutt** of Eugene, Oregon; 6.6 miles of grading and surfacing in Wibaux County for $59,146 to **Inland Construction Company** of Omaha; and bridges in Wibaux and Broadwater Counties for $70,135 to **Rue Brothers** of Bismarck, N. D.

The Bureau of Public Roads at Missoula received the following low bids November 28: for 6.8 miles of grading and culverts on the Clark Fork Highway, $68,655, from **Clifton & Applegate** of Spokane; and 5.3 miles of grading on the Columbia Falls Glacier Park Highway, $49,988 from **E. C. Powell** of Missoula.

Washington Notes

The Director of Highways has made the following awards: **Northwest Construction Company** of Seattle, 4 miles concrete pavement in King County for $184,320; **Northwest Roads Company** of Portland, 1.3 miles concrete pavement in Pierce County for $39,772; **N. A. Degerstrom** of Spokane, 3 miles of grading, surfacing and bridges in Pend Oreille County for $83,690; and **Frank J. Haas** of Grandview, 23 miles of grading in Grant County for $106,295.

Oregon Notes

The Bureau of Public Roads at Portland received the following low bids December 5: **Colonial Construction Company** of Spokane, $67,829 for grading .5 mile of the Randle-Yakima Highway; and **A. C. Greenwood, Inc.,** of Portland, $232,287 for grading 3.1 miles and building a tunnel on the Mt. Rainier National Park East Side Highway.

The State Highway Commission awarded the following contracts on bids received December 6: **Haskins & Brooks Construction Company** of La Center, Wash., .4 mile of grading on the Oregon Coast Highway in Douglas County for $40,364; and **Newport Construction Company** of Portland, $36,571 for 5.58 miles of grade widening and surfacing in Umatilla County.

On bids received December 20, the Commission awarded: **Edlefson-Weygandt Company** of Portland 9.2 miles of surfacing in Columbia and Washington Counties for $38,153; and **Dunn & Baker** of Klamath Falls 1.8 miles of grading and 8.5 miles of surfacing in Lake County for $86,099.

Nevada Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the State Highway Commission: **Dodge Construction Company,** Fallon, $129,046 for 23.19 miles of grading and surfacing in Esmeralda County, and $63,630 for 6.1 miles gravel surfacing in Nye County; **Fredrickson & Watson Construction Company** and **Fredrickson Bros.,** Oakland, $84,155 for 4.7 miles grading and structures in Douglas County; **Silver States Construction Company,** Fallon, $29,165 for 17 miles of oiling in Nye County; **Isbell Construction Company,** Carson City, $82,586 for 8.3 miles of grading and surfacing in Churchill County; **Utah Construction Company,** Ogden, Utah, $68,288 for 11.7 miles grading in Humboldt County, Nev.; **Jones & King,** Hayward, California, $63,499 for 8.5 miles grading and surfacing in Lyon County; and **Hoops Construction Company,** Twin Falls, Idaho, $100,811 for 49.7 miles gravel surfacing in Elko County.

A. A. Terteling & Son, Boise, Idaho, received award December 3, from the Bureau of Reclamation to construct the Rye Patch Dam near Lovelock for $256,322. The dam will be of earthen construction with a rock face, reaching a maximum height of 65 feet with a base width of 650 feet. The principal items of work are: 354,200 yards of open cut excavation, 3,000 yards of tunnel excavation, and 215,000 yards of earth and 25,000 yards of rock fill in the embankment.

Arizona Notes

By D. I. DAY

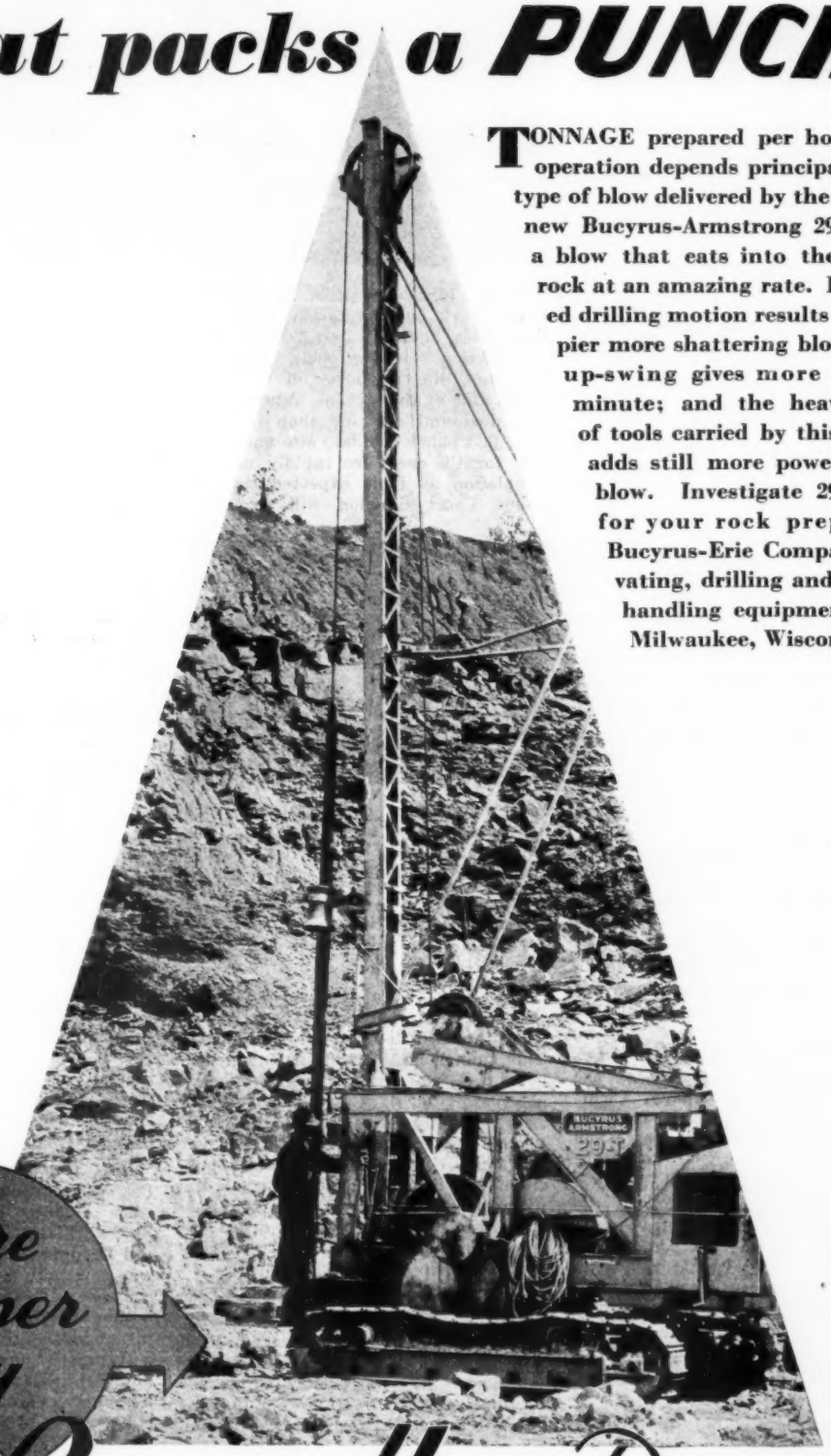
The Lee Moor Contracting Company is grading a 4½-mile section between Prescott and Jerome. The contract includes also oil processing by the road-mix method. The same contractors are working on a 10-mile job in Apache County in northeast Arizona near the New Mexico line. This latter contract includes grading, draining, placing select material, base course and mineral aggregate, and oil processing. The work starts near the town of St. Johns and runs south toward Springerville.

The Borderland Construction Company is grading and surfacing U. S. 80 in the town of Benson in Cochise County.

The Bureau of Public Roads project between Clint's Well and Flagstaff which has gone forward with dispatch under **Hodgman & McVicar** will be completed shortly. A section of the road is shown below.

G. R. Daley and **Vincent & Pringle** are making good progress on their 9.1-mile grading contract on Grand Canyon Route No. 8. The road connects the village of Grand Canyon with Hermit's Rest, both well known to visitors to Grand Canyon National Park.

The BLOW *that packs a* PUNCH!



TONNAGE prepared per hour of drill operation depends principally on the type of blow delivered by the drill. The new Bucyrus-Armstrong 29-T strikes a blow that eats into the toughest rock at an amazing rate. Its improved drilling motion results in a snappier more shattering blow; a faster up-swing gives more blows per minute; and the heavier string of tools carried by this new drill adds still more power to every blow. Investigate 29-T profits for your rock preparation. Bucyrus-Erie Company, Excavating, drilling and material-handling equipment, South Milwaukee, Wisconsin.

More hole per day

BUCYRUS ARMSTRONG

Blast Hole Drills

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Shots From the Firing Line—*Continued*

Skousen Brothers are grading 3.2 miles of the Cameron-Desert View approach to Grand Canyon National Park.

The New Mexico Construction Company is finishing the work of oil-surfacing approximately 17 miles of this route.

M. J. Bevanda is on the last lap of grading and draining 10.8 miles on the Kingman-Boulder Dam Highway, working in the vicinity of the Dam and extending south.

The All-Arizona Engineering and Construction Company is at work on a 3.5-mile job on the same highway.

Utah Notes

The State Road Commission has made the following awards: 2.2 miles of grading and surfacing in Salt Lake County for $121,223 to **Gibbons & Reed Company** of Salt Lake City; 1.54 miles of concrete paving in Utah County for $63,300 to **Lamph, Smith & Stevens** of Price; and .63 miles of concrete paving in Sanpete County for $37,524 to **Olaf Nelson** of Logan.

California Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the Division of Highways: **A. Teichert & Sons**, Sacramento, $23,917 for 2.3 miles of crusher run base surfacing in Sutter County; **P. F. Bender, Sacramento**, $27,023 for a bridge in Sutter County; and **Mittry Bros. Construction Company**, Los Angeles, $149,865 for 2.7 miles of grading and surfacing in San Mateo County.

The Southern Pacific Railroad Company, San Francisco, have awarded a contract to **Earl Heple**, San Jose, for five miles of right-of-way grading in San Jose.

County Board of Supervisors, Los Angeles, awarded contract to the **Macco Construction Company**, Clearwater, $124,175 for placing rock on the downstream face and crest, San Gabriel Dam No. 2.

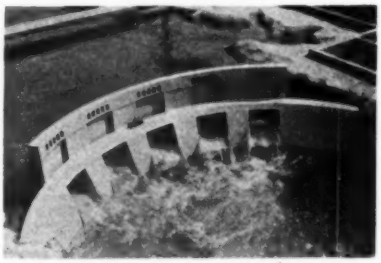
The City Commissioners of Santa Monica, California, are considering an **extension of the Santa Monica breakwater**, the estimated cost of which would be $1,943,000. This estimate includes 640,000 tons of rock. Bids for this work will probably be called for within the next 60 days.

Colorado River Aqueduct Notes

By K. CAMPBELL

On a re-advertised bid, the **Griffith Company** of Los Angeles was awarded a contract for 12.8 miles of conduits, siphons and canals at a bid price of $1,739,846. The latter included 6.28 miles of conduit, 5.61 miles siphons, and .91 miles of outlet channel.

Though legal difficulties are tying up actual work on the Parker Dam, **Six Companies, Inc.**, are going ahead with construction work on their camp and buildings, shown above, on the California side of the stream. A mammoth tool shed and machine shop is being built just below the dam site and quarters for the men are rapidly nearing completion as it is expected the Supreme Court decision will be given



some time early in January. Shown above is a model of Parker Dam. The five Stoney gates 50x50 feet, permit cleaning out the silt that settles at the dam.

Macco Corporation has a new Bucyrus-Erie 3½-yard electric dragline at work on the Freda Siphon job.

The J. F. Shea Company working the east and west portals of Cottonwood tunnel, holed through this month. This tunnel, 20,105 feet in length was holed through exactly seventeen months after starting work on the bore. The crews recently drove through 1784 feet in 161 shifts, an average of 11.1 feet per shift. Gilbert Shea, general superintendent on the job, is one of the youngest superintendents on the line. The Shea Company was awarded recently an additional 15½ miles of conduits and siphons at $3,200,000.

An award of a contract for furnishing five million barrels of cement—the largest order ever to be placed—at a cost of $7,000,000 was made to four Southern California cement companies by the Board of Directors. The bid was submitted by the California Portland Cement Co., the Monolith Portland Cement Co., the Riverside Cement Co., and the Southwestern Portland Cement Co. The unit price under this bid was $1.40 per barrel. This involves enough cement to complete all cement work which will be carried on in connection with the project. The District was also given the right to increase or decrease the quantity by twenty percent.

Crews of **Dravo Construction Company** working on the Valverde tunnel, holed through between shafts 1 and 2, the line of two sections of the tunnel missing by only five one-hundredths of an inch. The distance between the two shafts was 6,925 feet. This completes excavation on 2.7 miles of tunnel, the additional footage being obtained on the shaft driven east from No. 1 and west from No. 2, on the seven-mile tunnel job. A cash prize is given by this company to each shift boss who has worked the entire month without a lost time accident. A dinner is given by the company also to the key men of the organization each month, at which time talks are given on safety.

The crews of **Walsh Construction Company** at Copper Basin No. 2 now hold the record for the best week's progress of the year, driving through 274 feet of rock in one week, averaging approximately 13 feet per shift for 21 shifts. This tunnel is expected to be completed early in January, with about five hundred feet still to be drilled.

Southern California Notes

By K. CAMPBELL

Coachella Valley voters recently approved the All American canal contract with the Federal Government, thus **assuring the construction** of the Coachella Valley branch of the canal.

Bids for the dredging of Newport Bay were opened December 17 in the office of Major H. H. Stickney, United States District Engineer. The **Standard Dredging Company** of Los Angeles was low with a bid of $879,255. The contract calls for the starting of work within forty-five days from the awarding of bids. The contractor will dredge a turning basin in the harbor entrance and the government will then move in a hopper dredge to remove 370,000 cubic yards of material over the sand bar to clear the harbor by July 1.

Jack: "Say, Bill, if you had five bucks in your pocket, what would you do?"
Bill: "Check up to find out whose pants I had on."

LOW COST HAULAGE *with* The Austin-Western Trail Car

These ruggedly constructed, streamlined, semi-trailers are built in all practical sizes for handling coal, cinders, etc. The quick acting dump doors are air-operated and control is from the truck cab. Westinghouse Bendix air equipment is regularly installed and other accessories are of the same high standard. The fifth wheel is of the double oscillating type.

Austin-Western Trail Cars are built in two types—hopper bottom and side dump with drop doors. They are available in the size that is best suited to your requirements. Why not talk it over with our experienced engineers? Their recommendations will insure low cost haulage on your operation.

The Austin-Western Road Machinery Co.
Aurora, Illinois, U. S. A.

For your convenience in writing to The Austin-Western Road Machinery Co., you will find a card bound in this issue.

Not in the Contract

"Can you help me select a gift for a wealthy old aunt who is awfully weak and can hardly walk?"

Clerk: "How about some floor wax?"

Pat determined to pass his favorite saloon on his way home. As he approached it he became somewhat shaky, but plucking up courage, he passed it. Then, after going about 50 yards, he turned, saying to himself: "Well done, Pat, me boy. Come back and I'll treat ye."

A young lady went into the drug store.

"Have you any Lifebuoy?" she asked.

"Set the pace, lady," said the young drug clerk. "Set the pace."

Found in the Classified Section of a recent Sunday edition of the Seattle Post-Intelligence:

EXCHANGE: Steam shovel, roller, truck, for male water spaniel pup. 4128 Brooklyn Ave.

Another steam shovel gone to the dogs!

Customer: "Can I change these pants at this counter?"

Clerk: "Well, I'll tell you, mister, we have quite a few women shoppers, so maybe you'd better go to the dressing room in the rear."

A burglar's wife was being vigorously cross-examined by the county attorney.

"Madam, are you the wife of this prisoner?"

"Yes."

"You knew he was a burglar when you married him?"

"Yes."

"May I ask how you came to marry such an individual?"

"You may," snapped the witness. "You see, I was getting old and had to choose between a burglar and a lawyer."

MAJOR INDUSTRY

Ah, there blows the 5-o'clock whistle,
And shortly your dad will be here.
Have you finished with setting the table?
Are you sure there's his bottle of beer?
Now, fold up the newspaper neatly,
So while eating he'll scan the news.
And plump up the Morris-chair pillows,
And bring out his comfy old shoes.
He'll be tired—all day on his trilbies
Where they're building the new railroad station;
Yes, standing from 8 until 5—
And watching the excavation!

—Charles Doubleyou.

"Now, girls," said the restaurant manager, "I want you all to look your best today. Add a little dab of powder to your cheeks and take a bit more care with your hair."

"Something special on?" asked the head waitress.

"No," informed the manager. "The beef's tough."

"Let me show you something new in a snappy sedan," said the auto salesman. "It won't do you a bit of good," she replied, "and I don't think you could, anyway."

A contractor was at the fountain pen counter making a purchase. "You see," he said, "I am buying this for my wife."

"A surprise, eh?"

"I'll say so. She is expecting a Packard."

"Will you marry me?"

"No."

And they lived happily ever afterward.

Two Negroes who had not seen each other in five years discovered each had been married during this time.

"What kinda woman did you-all get, Mose?" asked Rastus.

"She's an angel, Rastus, dat's what she is."

"Boy you sho is lucky. Mine's still livin'," Rastus muttered sorrowfully.

"I hear that Miss Plainface is going to be married at last."

"Really! Who's the happy man?"

"Her father!"

A man went to see his physician for advice as to how to be cured of the habit of snoring.

"Does your snoring disturb your wife? "asked the M. D.

"Does it disturb my wife?" echoed the patient. "It disturbs the whole congregation!"

Fortune-Teller: "My friend, beware of a tall, dark woman, who will be constantly in your path."

Client: "That's going to be hard on her. I run a steam-roller!"

A minister one day while visiting one of his flock who had been a sailor, heard the parishioner's parrot make a few remarks in the way only a true sailor's parrot can. The man was very much embarrassed and apologized. The minister didn't seem alarmed, but said he had a parrot that prayed all the time. After a while the good Reverend made the suggestion that he thought his parrot would have a good influence on the sailor's bird. The sailor agreed, so the next day the minister brought his parrot to spend a few days with the other bird.

When the sailor's parrot saw the addition to his cage he immediately remarked, "How about a little loving, babe?"

Answer: "What the hell do you think I've been praying for all these years?"

A LIFE-LINE
80,000 Miles Long!

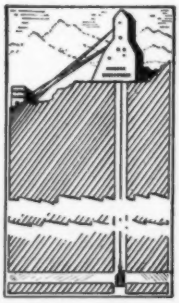
When the great bridge to be thrown across San Francisco's famed Golden Gate is completed, the safety of countless thousands will largely depend on two mighty main cables of steel. Weight: 11,000 tons each.

Spun by Roebling, these cables will contain 80,000 miles of Roebling Open-hearth Acid Steel Wire...wire noted the world-over for its strength, toughness, and stamina.

STEEL THAT "CAN TAKE IT"—MADE BY ROEBLING'S CUSTOM METHODS

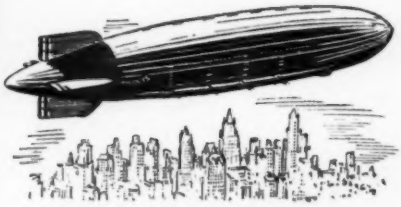
All Roebling Steel for bridge cables and wire rope is made in small, acid open-hearth furnaces...in Roebling's own mill...by painstaking custom methods. The exceptional uniformity and fatigue-resistance of Roebling Wire are largely due to this fine steel.

OVER 1 MILE INTO THE BOWELS OF THE EARTH



At new Ross Shaft of Homestake Mining Co., Lead, S.D., Roebling 1⅞" "Blue Center" Wire Rope is used for the ore hoist, one of the largest of its kind in the world. Active vertical lift now 5000 ft., eventually will be 5400 ft., over a mile.

DIRIGIBLE "MACON" USES ROEBLING BALLAST CONTROL ROPES



TO MAKE CERTAIN that Roebling Wire Rope will give the user the highest obtainable degree of safe, economical service, Roebling has enlisted the aid of the finest and most complete research, testing and manufacturing facilities. The small, acid open-hearth furnaces shown are examples. John A. Roebling's Sons Co., Trenton, N. J.

ROEBLING ...THE PACEMAKER IN WIRE ROPE DEVELOPMENT

For your convenience in writing to John A. Roebling's Sons Co., you will find a card bound in this issue.

Excavation for 1935 Highway Construction

(Continued from Page 27)

ing for $1,260,000; and 75 miles of low-type paving for $900,000. New bridges are estimated at $540,000.

North Dakota

Federal funds form the largest part of the funds North Dakota will have available for highway construction in 1935. Regular Federal aid is estimated at $250,000, the emergency fund is approximately $3,000,000, and revenue from the state gas tax and other sources is estimated to be $1,200,000. The total anticipated amount is $4,450,000, almost $3,000,000 under last year, a reduction of 40%.

The 1935 program plans to complete new construction totaling $3,250,000, while $1,200,000 will be spent for maintenance and other purposes.

According to J. N. Roherty, Research Engineer, the tentative construction program calls for grading 333 miles of new roads, involving 5,000,000 yards of excavation and costing $1,000,000; 66 miles of road will be widened or reconstructed with 1,000,000 yards of excavation and costing $200,000; 560 miles of road are to be graveled or stone surfaced involving 800,000 yards of excavation and costing $850,000; 75 miles of road will receive oil treatment, costing $300,000; eight miles of high-type pavement will be laid at an estimated cost of $300,000; 15 miles of low-type pavement at an estimated cost of $200,000; and $400,000 is required for bridges.

Work already contracted for and carried over involves approximately 2,225,000 yards of excavation at a cost of $500,000.

Ohio

Only preliminary estimates of Ohio's 1935 road program can be given at this time. Definite figures cannot be authorized until the new legislature convenes and acts.

A rough estimate, which is subject to considerable change, sets up $13,000,000 for new construction, $10,100,000 for maintenance, and $250,000 for other expenses.

The money, necessary for the above, is expected to come from the following sources: $4,500,000 regular Federal aid; $14,100,000 state gas tax, and $4,750,000 from other sources.

Based on spending $13,000,000 for new construction, the program calls for grading 5 miles of new roads costing $160,000; reconstructing or widening 50 miles, $1,000,000; graveling or surfacing 40 miles, $500,000; oiling 300 miles, $400,000; high-type pavement on 170 miles, $8,000,000; low-type pavement on 25 miles, $700,000; and bridge structures costing $2,000,000.

Oklahoma

As of December 15, 1934, Oklahoma had 50 Federal Aid projects under construction, totaling 158 miles, estimated to cost $2,698,000. In addition $3,012,000 is available for new projects and, for the 1935-36 fiscal year, will receive $2,947,521 under the terms of the Hayden-Cartwright Act.

Oregon

Oregon will have available for highway construction during 1935, approximately $7,000,000, this amount being some 15 to 20 per cent more than was available in 1934. Of this amount, NRA will furnish $3,000,000, Federal aid $2,000,000, and state funds $2,000,000.

According to S. H. Probert, Office Engineer, more than one-half of the available funds remain to be programmed, and no estimate of either the mileages or costs of the different classes of work to be performed can be made at this time. The work will be well distributed, however, as between bridge work, grading, rock and gravel surfacing, oiling, bituminous macadam surfacing and paving. Contracts let prior to January first will aggregate approximately $2,000,000, leaving $5,000,000 to be contracted during 1935.

The above mentioned amounts do not include $4,000,000 to be expended during 1935 on bridge work now under contract on the Oregon Coast Highway. This bridge work is being financed with PWA loan and grant funds. It involves five bridges having a total cost of $5,500,000. Construction operations were started in August, 1934.

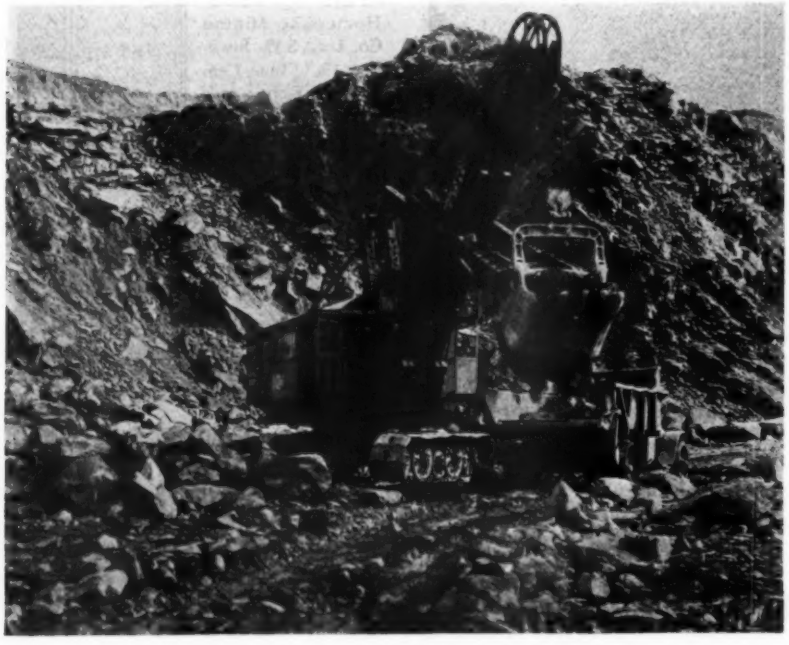
Uncompleted work, other than the bridge work mentioned above, to be carried over from 1934, will amount to about $500,000.

In addition expenditures for maintenance and minor betterment operations during 1935 will amount to about $3,000,000. Interest and principal payments on bonds will amount to $3,300,000. Other fixed expense will total about $700,000. These three items will therefore use $7,000,000 of Oregon's estimated income from state sources which is made up as follows: $7,000,000 from state gas tax, $2,000,000 from motor vehicle license fees, and $600,000 from motor transportation fees. This leaves some two million to go into the construction program as outlined in the first paragraph.

Pennsylvania

Samuel Eckels, Chief Engineer, advises that it is impossible to give any definite information regarding highway work to be undertaken during 1935. The program will depend entirely upon the money which will be made available for highway construction and maintenance by the 1935 session of the general assembly.

Pennsylvania received a Federal allocation of $9,590,788 as her share of the $200,000,000 appropriated by the Federal government for highway construction. These funds are practically all under construction or will be within a very short time and consist of the following: NRH Projects—These projects are all located on state highways ap-



● *Modern quarries use heavy duty equipment in getting out rock economically. A Bucyrus-Erie 100-B electric is shown here loading the blasted rock into a Mack truck.*

proved as Federal routes outside of municipalities and consist of 52 projects having a length of 93.52 miles at an estimated cost of $4,413,542. The type of construction will be macadam and concrete and includes some bridges. The widths of these projects are 18, 20, 30, and 40 feet and include a certain amount of widening of existing narrow width pavements. The highway department also proposes to perform roadside beautification on 15 projects at an estimated cost of $98,798. NRM Projects—These projects are located on state highways in municipalities which are extensions of approved Federal routes. It is proposed to construct 39 projects of the concrete and macadam types for a length of 27.05 miles, at an estimated cost of $2,437,182. The widths of these projects are 20, 30, 36, and 40 feet and in addition a small amount of widening of existing pavements is proposed. NRS Projects—These projects are located on important secondary or feeder roads mainly on the state highway system but not on the approved Federal Aid system. They consist of 76 projects having a length of 118.97 miles which it is proposed to construct at an estimated cost of $2,641,265. The type of pavement is macadam and concrete. The widths on these projects are 14, 16, 18 and 20 feet.

Rhode Island

The State Board of Public Roads, according to G. H. Henderson, Chief Engineer, estimates there will be available for 1935 road work approximately $2,700,000. Of this amount $1,500,000 will go to new construction, $1,000,000 to maintenance and $200,000 for other expenses. The $2,700,000 budget is based on receiving $1,000,000 from the Federal Government as emergency Federal Relief and $1,700,000 from state gas tax and vehicle license fees.

The tentative new construction calls for 26.1 miles of road construction to cost $1,200,000 and bridge construction to cost $300,000. 13.5 miles of new roads are to be graded and 12.6 miles of roads are to be widened or reconstructed. The excavation on this work is estimated to be around 450,000 yards. Of the 26.1 miles of road work to be done 12.5 miles will be graveled or stone surfaced and 13.6 miles will be of a high-type pavement.

There is no excavation work carried over into 1935.

The proposed expenditure for 1935 is about 40% less than that during 1934.

South Carolina

The activities of the State Highway Department for the fiscal year ending June 30, 1934 are summarized by State Highway Engineer Chas. H. Moorefield as construction expenditures being $3,556,593 and maintenance $1,110,008.

Construction work completed during the year was 338.15 miles bituminous surfacing, 15.27 miles standard pavement, 14.29 miles earth type roads, and 36 bridges.

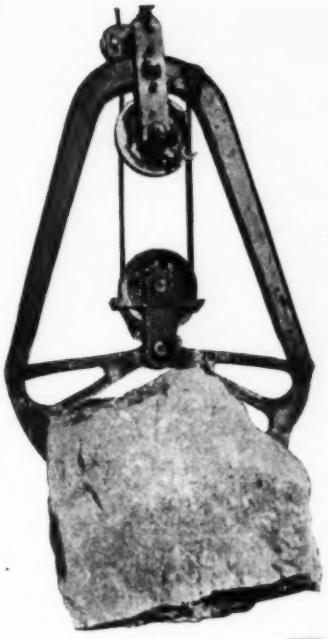
The status of the State Highway System as of June 30, 1934, was 2396.1 miles of standard pavement, 1214.95 miles of bituminous surfacing, 1295.49 miles of improved earth types, giving a total of 4906.54 miles of completed construction. Work under construction consists of a total of 348.16 miles, of which 2.6 miles are standard pavement, 340.46 miles are bituminous surfacing, and 5.1 miles are improved earth types; there are also 744.48 miles of unimproved roads. The total mileage under state supervision is 5999.22.

The construction program for 1935 will be limited almost entirely to work financed in whole or in part by Federal funds provided by the Hayden-Cartwright Act, of which South Carolina's share for the year ending June 30, 1935 will be $2,770,000.

South Dakota

The proposed 1935 expenditure of the State Highway Department is estimated at $6,750,000, representing a 15% decrease from last year.

This sum is derived from the following sources: $800,000 from regular Federal aid; $3,000,000 from emergency Federal aid; $1,950,000 from gas tax; $450,000 from National Recovery Work Relief and PWA; and $550,000 from motor vehicle and common carrier license fees.



Strength Over the Jungle

Built for an ex-slave who became king of Haiti—the construction cost of the Citadelle La Ferriere was 20,000 lives. Rocks and guns weighing 5 tons were carried up the sheer 700 foot sides of the mountain by man-power . . . placed in the massive 140-foot fortress walls in the same way. For 125 years this picturesque fortress has looked out from its mountain perch over the tropical jungle of the mysterious island of Haiti. Many of the crude methods of handling rock used by the Haitian soldiers over a hundred years ago are still being used today.

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● *This Schramm air-compressor powered with a Caterpillar Diesel engine furnished air to operate the drills on a 6-mile road job in the heart of the Black Hills. The U. S. Forest Service constructed a new scenic highway between Deadwood and Rapid City, So. Dak.*

It is estimated that $4,825,000 will be spent for new construction, $1,500,000 will be used for maintenance, and $425,000 is required for engineering and overhead.

At the date of writing the State Highway Department advises that the entire road construction program for 1935 has not yet been formulated. So far $2,865,000, of the $4,825,000 considered available has been apportioned as follows: 295 miles of new roads to be graded involving 2,300,000 yards of excavation and to cost $890,000; 95 miles of roads to be widened or reconstructed requiring 1,600,000 yards of excavation and to cost $420,000; 415 miles of road are to be graveled or stone-surfaced requiring 500,000 yards of excavation, and to cost $420,000; 50 miles of road will receive oil treatment, at a cost of $310,000; 27 miles of high-type pavement will be laid at an estimated cost of $625,000; and 27 bridge structures built to cost $200,000.

In addition, work carried over into 1935 amounts to $218,000 and involves approximately 650 000 yards of excavation.

A total of 14,780 miles of Federal Aid roads was completed in the year, bringing the total mileage completed since 1916 to 119,712, this being more than half of the Federal Aid system. The active public works highway program for the fiscal year 1934 totaled 22,378 miles. By the end of June, 6,986 miles were completed, 13,674 miles were in various stages of construction, and 1,718 miles were approved for construction.

Improvements were constructed on 938 miles of forest highways, bringing the total mileage improved to date with Federal funds administered by the Bureau of Public Roads to 5,868 miles. Work was in progress at the end of the fiscal year 1934 on 1,089 miles.

In the national parks the Bureau built for the Interior Department 157 miles of roads during the year, making a total of 831 miles thus far improved. The work of the Bureau in park road construction for the National Park Service has been greatly expanded. Practically all of the money appropriated for the construction of roads on Federal public lands other than forests was obligated during the year to various projects in the States containing these lands.

Tennessee

The 1935 highway program will be considerably smaller than 1934 due to a decrease in funds received from the Federal Government. The amount received is about 50% less than last year. Under the terms of the Hayden-Cartwright Act, Tennessee receives approximately $4,500,000. Anticipated income from state gas tax is set at $1,620,000, and from motor vehicle license fees, $2,680,000.

The tentative program, according to W. S. Whitman, provides $4,500,000 for new construction and $2,040,000 for maintenance.

Complete figures are not available but it is planned to grade 102 miles of new roads, reconstruct or widen five, and pave 85 miles with a high-type surface.

Texas

During the fiscal year ending August 31, 1934, Texas spent $25,524,828 for road construction. This was a slight decrease compared with the $28,480,466 spent the year before. Maintenance during the same period amounted to $9,135,447. Other expenditures brought the total disbursements to $36,035,108, leaving a cash balance of $8,683,763, slightly better than twice that of the previous year.

The annual statement of cash receipts and disbursements issued by E. J. Amey, Statistical Engineer shows that income for the last fiscal year came from the following sources: regular Federal aid, $4,097,559; NRA funds $16,542,885; state gas tax, $15,045,144; vehicle license fees, $4,622,501; and other items bringing the total to $40,691,612.

The first National Recovery projects under the Texas allotment of $24,244,024 were let in August 1933, and between that time and August 31, 1934,

● *On a road project through the Bad Lands National Monument in South Dakota, Chaulk & Birdsall prepare the ground for the scrapers with a ripper pulled by a Caterpillar Diesel Fifty.*

● *J. C. Ruby of San Antonio, Texas, keeps things moving on his road job near that city. Seen here in the borrow pit is his Caterpillar elevating grader, pulled by a Caterpillar Diesel Seventy-five loading Euclid "Trac-Truks".*

1,801 miles were let at contract prices amounting to $24,153,975. There were also a number of state projects let, and a summary of all construction contracts for this fiscal year is as follows: 1,209.6 miles of grading and small drainage structures for $10,717,464; 141.36 miles gravel, caliche, shell, etc., surface for $765,184; 888.56 miles of asphalt surface $8,610,907; 231.3 miles concrete and brick for $6,433,593 and major structures $4,407,637.

During the fiscal year ending August 31, 1934, the following miles of construction were completed with the cost as shown: grading and small drainage structures, 850.8 miles with a cost of $7,179,925; 151.6 miles gravel, caliche, shell, etc. surface costing $821,873; 709.15 miles asphalt surface costing $4,414,175; 198.91 concrete and brick costing $4,844,899; and major structures at a cost of $1,319,390. This gave a total of 1,910 miles at a cost of $18,580,263.

In addition to the contracts completed, there were on August 31, 1934, 1,589 miles still under contract as follows: 784.29 miles grading and small drainage structures costing $8,692,291; 60.42 miles gravel, caliche, shell, etc. surface for $441,766; 586.99 miles asphalt surface for $5,888,373; 156.87 miles concrete and brick for $4,199,985; and major structures costing $3,948,288; giving a total of $23,170,705.

In addition to the 1,589 miles shown above as active, there were also 774.5 miles of grading and small drainage structures; gravel, caliche, etc. surfacing being constructed as Storm and Drought Relief projects. These projects are being handled on the basis of 30% of the cost being furnished by the Public Works Administration through the Bureau of Public Roads and the State Highway Department, and the remainder, consisting of labor, being furnished by the Relief Commission.

Texas' allotment under the Hayden-Cartwright Act, amounts to $12,291,253. Contracts let on November 8th

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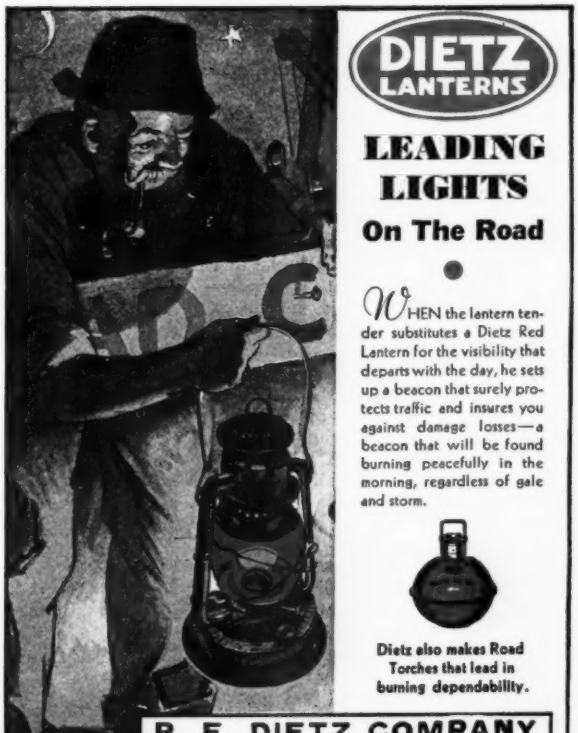

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● *Dumping the big ones on this road project in the Blue Ridge Mountains is easy because the Linn Tractor has a down-folding tail-gate.*

and November 26th, 1934, under this allotment amounted to $2,247,820, and the balance will be placed under contract as rapidly as plans are approved by the Bureau of Public Roads. As the states revert to the former allotments of the Federal Aid beginning with the Federal fiscal years 1935-36, Texas Federal aid will amount to approximately $7,500,000 per year, which must be matched dollar for dollar with state funds. With State Highway Department revenues from the gasoline tax and license fees remaining constant at $18,000,000, and with $10,000,000 necessary for general maintenance and betterment work on the 19,922 miles of State Highways maintained, the balance is barely enough to match Federal aid.

In line with plans being formulated for a Texas Centennial Exposition in 1936 to celebrate the 100th anniversary of Texas freedom, to which celebration the entire nation is cordially invited, the Highway Department is concentrating its efforts on the closing of gaps in the main highways during 1935-36.

Utah

Since the 1935 budget for highway expenditures is not yet complete or approved, Chief Engineer K. C. Wright is not able to give in detail full information regarding Utah's 1935 road program.

Tentatively, however, he advises that the program involves a total expenditure of $4,200,000 distributed as follows: for new construction $3,000,000; for maintenance $1,000,000; and for other expenses $200,000. This represents a decrease of approximately 15% over work performed last year.

The money to complete the 1935 program is expected to come from the following sources: regular Federal aid $1,700,000; state gas tax $2,400,000; and license fees and others $100,000.

The $3,000,000 tentatively planned for construction work is divided as follows: $200,000 for grading new roads; $700,000 for widening and reconstruction; $600,000 for graveled or stone-surfaced roads; $600,000 for oil treatment; $400,000 for high-type pavement; $100,000 for low-type pavement; and $400,000 for bridge structures. Due to the incomplete state of the program, mileages and excavation involved can not be given at this time.

Work contracted for in 1934 or previously and carried over into 1935 will involve 500,000 yards of excavation at an estimated cost of $175,000.

Vermont

Highway work in Vermont for 1935, except for the carry over of some 35 projects, amounting to $400,000, coming under the National Recovery Funds available in 1934, will be dependent on funds made available by the State Legislature and by the Federal Government. As the 1935 Federal Aid must be matched it is necessary for the Legislature to appropriate the necessary funds. The Legislature convenes in January, so no 1935 forecast will be available until it takes action.

Under the Hayden-Cartwright Act Vermont receives $609,375 for the fiscal year beginning July 1, 1935.

During 1934 the highway work completed, consisted of 17.1 miles of concrete pavement; 21.4 miles of macadam; 3.3 miles of bituminous concrete; and 99.1 miles of bituminous-treated gravel.

The work carried over in 1935, estimated to cost $400,000, consists of 1 mile of concrete; 4 miles of macadam; 21 miles of treated gravel; 3 miles of gravel; and 18 miles of grading base course and drainage involving approximately 100,000 yards of excavation.

Virginia

While final figures are not yet available, the Department of Highways expects to have available for construction work during 1935, approximately $7,116,000, a $2,700,000 decrease from the $9,816,000 spent last year. In addition, according to Auditor C. J. Allard, $5,200,000 will be spent for maintenance, $5,952,000 on the secondary road system, and $349,000 for other purposes.

● *The West Virginia State Highway Department uses this Allis Chalmers Model "L" tractor and No. 14 grader to smooth up this mountain road.*

The $18,617,000 required for this program is expected to be derived from the following sources: $3,700,000 from Federal emergency relief funds, $7,048,000 from state gas tax, and $7,869,000 from vehicle license fees and other sources.

A detailed forecast of the distribution of the $7,116,000 to be used for construction is not available at the time of writing.

Washington

Funds expected to be available for construction in 1935 are about 8% less than 1934, according to L. V. Murrow, Director of Highways. The proposed budget sets up $4,400,000 for new construction and $2,250,000 for maintenance.

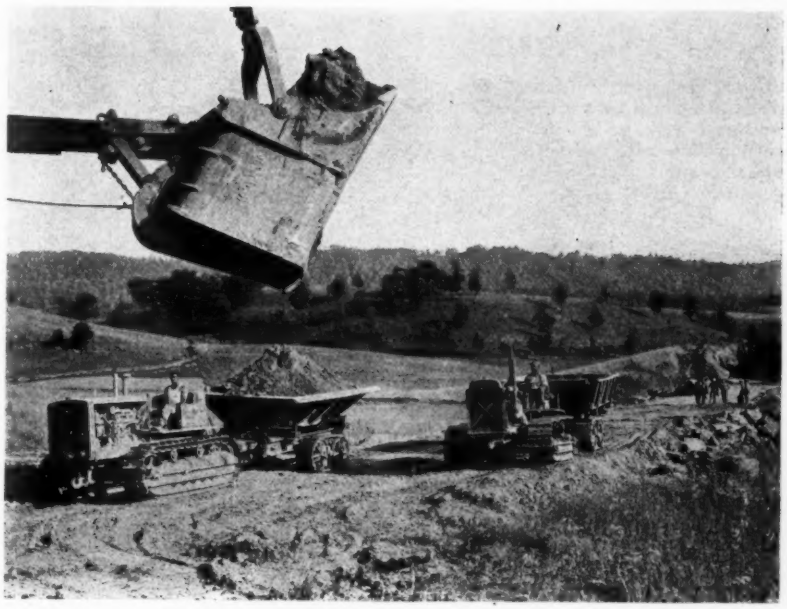
This money will come from Federal aid, amounting to $1,900,000, and from state gas tax and motor vehicle license fees amounting to $4,750,000.

Detailed figures showing distribution of the construction money are not available, but in general the fund will be apportioned as follows: 45% to go for grading and stone surfacing; 20% for oiling; 20% for paving; and 15% for bridge structures.

West Virginia

It is expected that the State Road Commisison will have available approximately $13,940,000 with which to carry on its 1935 program. Of this amount $10,640,000 will be used for construction, an increase over last year, $1,500,000 for maintenance on primary roads, and $1,800,000 for maintenance on secondary roads.

These funds will come from the following sources; $1,140,000 from regular Federal aid; $2,000,000 from PWA grant; $2,000,000 from emergency Federal relief; $5,000,000 from state gas



● *Gilbertson Construction Company recently completed this 11-mile state road near Alderson, W. Va. Caterpillar Diesel 50's with Euclid and Athey crawler wagons hauled approximately 500,000 yards of rock and earth.*

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● *Nolan Brothers, Inc. of Minneapolis used Koehring Dumptors to good advantage on their 7½-mile road job north of Prairie du Chien, Wisconsin. Four 4-yard Dumptors helped dispose of over 400,000 yards of excavation.*

tax; $5,000,000 from motor vehicle license fees; $1,800,000 from an appropriation from the state for use on secondary roads; and $2,000,000 from the sale of state bonds.

Figures showing how the construction money is to be used are not available at the time of writing.

Road work carried over into 1935 will amount to approximately $2,500,000.

Wisconsin

Preliminary plans for 1935 highway work call for a total expenditure of $15,500,000, an increase of $2,500,000 over last year. $11,000,000 will be used for new construction and $4,500,000 for maintenance.

This program is based on receiving $3,000,000 from regular Federal aid; $4,000,000 from the emergency Federal relief fund; and $8,500,000 from the state gas tax; all subject, of course, to release of funds by legislative action.

The tentative program on which the $11,000,000 of construction money will be spent is made up as follows: $1,900,000 for grading 200 miles of new roads; $2,000,000 for reconstructing and widening 230 miles of roads; $1,000,000 for graveling or stone-surfacing 130 miles; $100,000 for oiling; $3,000,000 for high-type pavement on 100 miles; $1,000,000 for low-type pavement on 150 miles; and $2,000,000 for bridge structures.

Road work, contracted for in 1934 or previously, carried over into 1935, amounts to approximately $300,000 with 500,000 yards of excavation involved.

Wyoming

The amount of road work to be done in Wyoming during 1935 will be quite a bit less than that done during 1934, due to decreased revenues. The amount of money expected to be available, according to C. C. Warrington, Office Engineer, totals $4,294,247, representing a decrease of about 33% over last year. While the budget will not be made up until next March, preliminary figures allot $3,277,747 for new construction, $735,000 for maintenance, and $281,500 for other expenses.

These funds are derived from the following sources; $1,977,747, regular Federal aid $1,100,000 state gas tax; and $1,217,000, other sources.

Figures showing the distribution of the construction fund are not available at the present time.

Funds for Roads in Public Lands

From statement by Bureau of Public Roads as of October 31, 1934.

State	Unobligated And Not Under Construction	Under Construction	Total
Arizona	$ 363,503.84	$ 443,492.83	$ 806,996.67
California	364,547.81	588,439.10	952,986.91
Colorado	92,144.00	375,881.00	468,025.00
Idaho	131,682.00	231,165.58	362,847.58
Montana	137,901.00	227,867.41	365,768.41
Nevada	803,162.51	481,657.34	1,284,819.85
New Mexico	225,312.45	113,754.57	339,067.02
North Dakota	59,296.07	24,191.91	83,487.98
Oklahoma	23,053.96	62,798.63	85,852.59
Oregon	170,861.00	153,010.86	323,871.86
South Dakota	49,893.63	131,007.37	180,901.00
Utah	203,061.00	205,169.08	408,230.08
Washington	33,723.50	18,696.70	52,420.20
Wyoming	239,898.00	17,354.00	257,252.00
Totals	$2,898,040.77	$3,074,486.38	$5,972,527.15

Use of Brick in Pavement Doubles in 1934

ACCORDING to reports received to date the total shipments of paving brick used in 1934 will attain a total of 125,000,000 or at least double the quantity used in brick pavements in 1933.

O. W. Renkert, Canton, Ohio, President of the National Paving Brick Association, accounted for this 100 per cent increase over the previous year by citing several factors responsible for expanding the use of vitrified brick as a street and highway surfacing material. The construction of widened arterial arteries of traffic in and through municipalities has been favorable to the heavy-duty type of pavement such as brick. Relief to traffic is provided where there is the most congestion and employment afforded in populated districts where distress is the greatest.

New Scioto-Sandusky Water District

PLANS FOR the Scioto-Sandusky Conservancy District have been approved by judges from the seventeen central counties forming the district in Ohio. The district extends from Lake Erie to the Ohio River. This court also appointed three conservancy commissioners who will go to Washington and lay the plans of the district before the PWA for negotiating Federal financing.

The present tentative program of the conservancy district proposes reservoirs on the Sandusky River at Tiffin and Upper Sandusky, on the Scioto River near Bellepoint, on the Olentangy River above Worthington and Delaware, on Darby Creek above Harrisburg, on Deer Creek west of Williamsport, on Paint Creek west of Bainbridge, on Rocky Fork west of Paint Creek, on Salt Creek east of Richmond Dale, and a diversion channel which will connect the Scioto and Sandusky Rivers.

The total estimated cost of the ultimate project is about $35,000,000. The conservancy court estimated that the government would furnish about $24,000,000, with the state contributing $5,000,000, and the remainder to be paid by the seventeen counties in the district.

SPECIALTIES that will save you money!

Electric Blower

The efficiency of your motor or generator is increased if you keep it free from dust, dirt and moisture. Electrical experts advise cleaning once a week. Use one of our portable electric blowers. They give an ample supply of clean, dry air. Will not injure windings or insulation. Delivers 50 feet of free air per minute at nozzle velocity of 290 feet per second. Furnished with 120, 220 or 250 volt, AC or DC ½ H.P. motor.

BECO Lining

Built to stand the gruelling treatment of modern excavator operation. Smooth, sure control and long life are proven features of Beco Lining. Send a trial order and prove its economy for yourself.

BECO-LINING

Lighting Plants

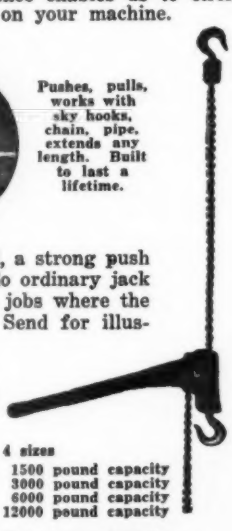
For shovels, draglines, cranes, or clamshells; steam, gasoline or Diesel drive; we can supply complete lighting plants that will give dependable service. Whether you want a night shift or only an occasional overtime run, they give adequate illumination for operation at any time. Simple and inexpensive to operate. Convenient for night repairing. Our extensive experience enables us to offer the right plant for best service on your machine.

BECO Jacks

Pushes, pulls, works with sky hooks, chain, pipe, extends any length. Built to last a lifetime.

Cut your repair costs with a Beco Jack. Saves money on every job where a tight hold, a steady pull, a strong push or a heavy lift is needed. Will do ordinary jack work and a countless number of jobs where the usual type jack couldn't work. Send for illustrated description.

Handy Hoists



A one man tool with no surplus chains to tangle, no heavy block to lift. Either end may be hooked to the load. Easy to operate, easy to move and attach. Often saves its costs on a single repairing job. Write for full description and prices.

4 sizes
1500 pound capacity
3000 pound capacity
6000 pound capacity
12000 pound capacity

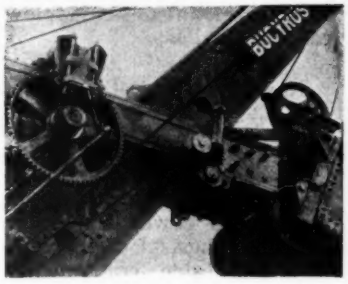
Hand operated. Or with electric power in 4 sizes from ¼ to 2-ton capacity.

Fire Gun

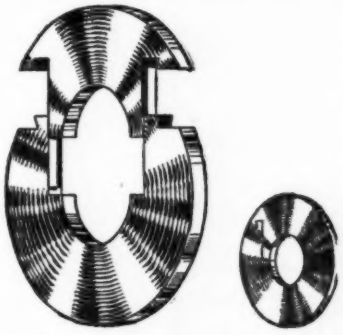
Why risk loss from fire when you can have such handy protection. At least one should be kept handy on every excavator, truck, drill, etc. Fire Gun acts quickly, can be used without danger on electric equipment and will not cause damages to machinery or materials. Fire Gun liquid has practically no wetting effect. Range over 25 feet.

Power Dipper Trip

Save seconds in each digging cycle with a power dipper trip. Bring your excavating equipment up-to-date, save waste energy by your operator, cut down the time of the digging cycle with a Bucyrus-Erie power dipper trip. Simple, positive in action. Available for steam, Diesel, gasoline or electric powered shovels.



BECO Thrust Collars



Keep gears and pinions in mesh, save wear, eliminate unnecessary shutdowns by using these easily installed Beco Thrust Collars. No need to dismantle machinery, just slip in and tap the overlatch into place. When ordering give inside and outside diameters and thickness of washers required.

BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WIS.

SPECIALTY DEPARTMENT

Gentlemen:

Please send full information on the articles checked:

- ☐ Wire Rope
- ☐ Rope Sockets
- ☐ Rope Clips
- ☐ Hoisting Chain
- ☐ Cold Shuts
- ☐ Patent Links
- ☐ Syphons
- ☐ Injectors
- ☐ Brake Linings
- ☐ Wood Blocks
- ☐ Asbestos Fabric
- ☐ Asbestos Blocks
- ☐ Fire Box Arches
- ☐ Fuel Hoists
- ☐ Dipper Trips
- ☐ Steam Fans
- ☐ Rail Clamps
- ☐ Rail Chairs
- ☐ Rails
- ☐ Bridles
- ☐ Suction Hose
- ☐ Oil Pumps
- ☐ Drain Valves
- ☐ Jacks
- ☐ Hand Hoists
- ☐ Asbestos Packings
- ☐ Flexible Metallic Packings
- ☐ Moulded Metallic Packings
- ☐ Oil Burning Equipment
- ☐ Power Transmission Cable
- ☐ Dragline Rollers
- ☐ Dragline Buckets
- ☐ Lighting Plants
- ☐ Fire Gun
- ☐ Repair Washer
- ☐ Portable Electric Blower
- ☐ Rock Grab
- ☐ Dippers
- ☐ Dipper Teeth
- ☐ Beco Upholstered Seats

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City .....

When writing to Bucyrus-Erie Co., please use coupon or card bound in this issue.

Equipment You Ought to Know About

(Continued from Page 31)

speed, and four feet of snow in fourth speed at 8 M.P.H. It has a maximum drawbar of 45,587 lbs. and a torque of 610 ft. lbs. The motor is a Hercules 6-cylinder model HXE which develops 174-H.P. Bore is 5¾" and stroke 6".

The Model 6H-33 is equipped with closed cab, pneumatic-tired wheels or sled steerage, electric lights and starter, high speed reverse (5 speeds each way) and platform body with sides, suitable for mounting snow plow and carrying ballast.

New Atlas Diesel Announced

THE Atlas Imperial Diesel Engine Company of Oakland, Cal., has recently brought out a new 4-cylinder Diesel engine applicable to power shovels, draglines, cranes, locomotives and other portable equipment used in the excavating industry. This new engine, known as Model 4AN115, is of the cold-starting full-Diesel type—of simple, sturdy construction which assures long life and trouble-free operation. According to the manufacturer the principal innovation of this new model is the Atimco injection system in which the complete control of all phases of the injection process is centralized in one compact unit. All the desirable characteristics of the old common rail system have been retained, but all delicate adjustments eliminated. Instead of mechanically operated valves for each cylinder, this unit is operated with a distributor, and fuel metering valves, which are supplied with fuel by a constant pressure accumulator. The same identical valves meter the fuel quantity to all cylinders so that this system automatically insures that the same quantity of fuel is delivered to each cylinder in turn. The new model is reported to consume only .42 lbs. of Diesel fuel per h.p. hour, when delivering the rated horsepower at 700 r.p.m., and .44 lbs. under the same conditions at 1000 r.p.m. Most gasoline engines comparable in size would use twice this amount of gasoline. As the price of Diesel fuel is about one-third of the price of gasoline, the manufacturers estimate the model 4AN115 will furnish power at approximately one-sixth the cost of the gasoline engine.

Specifications include: 4¾" x 6½" bore and stroke; piston displacement, 460 cubic inches; "Ferchrome" exhaust valves; chrome nickel alloy intake valves; oil sump capacity, 4 gallons; plate type clutch; centrifugal pump for radiator cooling; tubular core type radiator; 32Y electric starter; 10 Amp. generator; and net weight, 2,600 lbs.

New General Electric Thrustor

A NUMBER of improvements in the G-E thrustor, a self-contained combination of motor-driven centrifugal pump, oil chamber, and piston that produces a smooth straight-line thrust through a definite length of stroke especially suitable for the operation of clutches, brakes, valves, doors, etc., have been announced by the General Electric Company.

The new line of thrustors consists of a complete range of standard models providing 10 combinations of thrust and stroke ratings varying from 50 to 3200 pounds thrust and from 2 to 16 inches stroke.

As a smooth acting, straight-line operating device, subject to manual, remote, or fully automatic control, the thrustor is suitable for a wide variety of applications in many fields.

Worthington Announces New Wagon Drill

A RECENT ADDITION to its extensive line of drilling equipment announced by the Worthington Pump and Machinery Corporation of Harrison, New Jersey, is the new Rock Master, which has been developed to speed up many classes of drilling that require a light weight mobile rig. This rig is readily adaptable

for down-hole drilling and snake-hole drilling; in fact its makers state that there is some part of any drilling work which the Rock Master can do more easily and more quickly than by using any other types of equipment. It can be readily moved from place to place and can be taken to any job where a hand drill can be used. It is used extensively for deep-hole drilling up to 20 feet, supplemented by hand-held drills for boulder popping. The Rock Master is equipped with a quick and effective hole-spotting device; can be furnished with feeds to accommodate a 3', 4' or a 6' maximum steel change; and is recommended for holes up to 20' depth.

We Supply TRAINED DIESEL MEN

From Chicago, Los Angeles and Seattle

Former Diesel, steam and gas engineers, machinists, shovel and caterpillar operators, sales engineers. These properly trained Diesel men will make valuable Diesel operators, maintenance men and salesmen for you. Many firms now look to us for their Diesel help. Write, wire or phone your requirements, we have the man you want.

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NEW YORK 500 Fifth Ave. — CHICAGO 1259 Diversey Pkwy.
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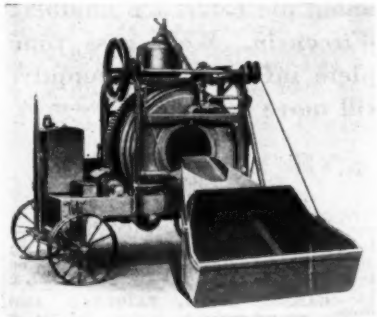
Koehring Develops New Line of Mixers

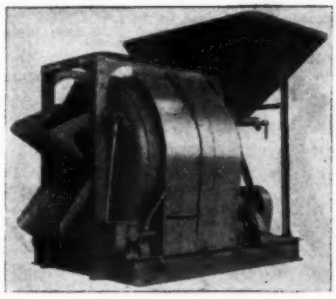
THE KOEHRING Company has developed during this past year a complete new line of construction mixers, ranging from sizes 7-S to 84-S inclusive.

The Dandie Trail Mixers, which include sizes 7, 10, and 14 in both the four-wheel type and trailer type, were designed primarily to include all modern improvements and advanced features, especially stressing the use of lightweight but high strength materials. These machines are full anti-friction bearing equipped, with multiple V-belt drive to a gear reduction unit completely enclosed and guarded. Other important features are the Koehring automatic



skip-flow shaker, full spring mounting, automatic measuring water tank and extremely short wheel base for the four-wheel machines, and an exceptionally low overall width for the trailer type.

The heavy duty construction mixers, in sizes 28-S, 56-S and 84-S, have been completely redesigned during this year. The most important development in these machines is the Koehring flowline discharge, which is an outstanding advance in construction mixer design. It further increases the speed of the previous fast discharge of Koehring construction mixers. The high side of the tilted discharge chute reaches far into the drum and immediately underneath the full width of the bucket. Thus the full load of each bucket is taken in the first revolution by the discharge chute when in a discharging position, with a minimum of spill and dropping of the concrete. In addition these machines have the following features: a decidedly shorter frame, due to the fact that the power plant is mounted directly behind the drum and under the charging hopper; a mechanically simple power discharge, having only one spur gear, one spur pinion and one cam; multiple V-belt drive with enclosed gear case; full anti-friction bearings; and operating levers arranged for plant operation.



Novo Announces New Self-Priming Pump

A NEW 2-inch self-priming centrifugal pump, known as Model V-AS-2, has just been announced by the Novo Engine Company, Lansing, Michigan. According to the manufacturer this pump has a guaranteed capacity of 8,500 gallons per hour at 10-foot head and is powered with a Novo 2½-HP Model AG, single-cylinder water-cooled engine. The pump discharge pipe passes through the engine hopper, thus keeping the engine cooling water at the proper temperature.

The pump makes use of two leather seals on the impeller shaft in place of packing. These seals have been used for over two and a half years on Novo self-priming centrifugal pumps, according to the announcement, and not one has had to be replaced.

Sullivan Offers New Portable Two-Stage Compressor

THE SULLIVAN Machinery Company of Chicago, Illinois, announces a new portable air compressor, Type WK60. This new compressor is a two-stage design of the angle or "V" type with the air end air cooled. According to the manufacturer this design reduces fuel consumption which is also decreased by a new wafer valve of exceedingly large port area and low lift. The design of air ports and air piping provides minimum resistance to air flow. The base is welded structural steel. The main bearings are ball bearings. The number and weight of all reciprocating parts are reduced to a minimum. The new

(*Continued on Page 58*)

FASTER DIGGERS!

Less cable overhaul and super-digging power of Williams "Champion" Buckets are features that save crane time and add to your profit per job.

WILLIAMS
• BUCKETS •

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THE WELLMAN ENGINEERING CO.
7002 Central Ave.
Cleveland, Ohio

Long Range Digging at Lowest Cost

For digging in rivers, ponds or deep pits—use a SLACKLINE CABLEWAY. For cutting down a hill, making a fill, building a levee or earth dam, digging a canal—use a CRESCENT SCRAPER.

SAUERMAN BROS., INC.
474 S. Clinton St., Chicago

One man Excavators handling 10 to 600 cu. yd. per hour. Spans from 200 to 1500 ft.

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EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number. to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE— Cats—15½' long, 9' wide, 22" Treads. 100 H.P. Waukesha High Alt. Engine. SCD-1.

P&H MODEL 208—45' BOOM DRAGLINE— 4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20.

BUCYRUS-ERIE 30-B DIESEL 40' BOOM DRAGLINE. SCD-21.

MONIGHAN MODEL 1-W WALKER — 60' Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

MEAD-MORRISON GASOLINE COMBINATION SHOVEL-CLAMSHELL. ½ cu. yd. Dipper, 17' Dipper handle—18' Boom—32' Clamshell Boom and ½ yard Erie Clamshell Bucket. 5"x6" 4-cyl. Wisconsin Engine. Good mechanical condition. Bargain Price. SCD-28.

MAY CITY "PUP" GASOLINE CLAMSHELL. Good mechanical condition. SCD-24.

BYERS "BEARCAT" Gasoline ⅝-yard Shovel. Hercules engine. Overhaul. Good mechanical condition. SCD-25.

THEW-UNIVERSAL MODEL 35 — Gasoline — ½ cubic yard standard shovel equipment—25' lattice type crane boom and ½ yard Williams bucket with teeth—complete drag shovel attachment and skimmer scoop bucket, including home-made trailer. Excellent condition. SCD-26.

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

KOEHRING MODEL 1—30' Boom Gasoline Crane. Cat Mounted—No Bucket—4½"x5" Wisconsin Engine. SCD-19.

Shovel Equipment

⅝ CU. YD. DIPPER—20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035—brand new. SE-1.

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2.

COMPLETE FRONT END EQUIPMENT

¾ YARD PLATE DIPPER, 19'9" BOOM, 18'4" DIPPER HANDLE—Shovel equipment suitable application Bucyrus-Erie B or B-2. Good condition. SE-29.

⅞ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

¾ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE — High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment, suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1 CU. YD. DIPPER—23' BOOM—12'6" Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. Brand new. SE-4

1 CU. YD. DIPPER—24' BOOM—18' DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25.

1 CU. YD. DIPPER—24' BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-26

1¼ CU. YD. DIPPER—22'6" BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-27.

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on 30-B Diesel. Brand New. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Skimmer Scoop

⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. Brand New. Shipment 2 to 3 weeks. SS-1.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER —24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. Rebuilt —New Machine Guarantee. DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

3 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

2 ⅞ CU. YD. Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Slightly used. D-36

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Brand New. D-37

1 ⅞ CU. YD.—Plate front.—Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 CUBIC YARD MANGANESE DIPPER. Will fit Bucyrus-Erie B-2 or GA-2. Good condition. D-40

2 1 CU. YD.—Cast Front Inserted Tooth Dippers. Rebuilt and Guaranteed. Suitable for application GA2 or GA3 Machines. D-34

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2, 41-B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2. Brand New. D-27

1 1¼ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 37-B. Slightly used. D-38

1 1⅛ CU. YD.—PLATE. Will fit E-2. Brand New. D-28

1 1½ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 43-B. Slightly used. D-39

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

BRAND NEW

2 ¾ CU. YD. PAGE CLASS "C." Approximate weight each 2425 lbs. DB-1

1 1½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 2900 pounds. DB-15

3 2 CU. YD. PAGE CLASS "C." Approximate weight each 5630 lbs. DB-4.

1 2¼ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3850 lbs. DB-13.

1 2½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 4600 lbs. DB-14.

REBUILT

1 2 CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3200 lbs. DB-12.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Approximate weight 6500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Approximate weight 5400 lbs. DB-10.

USED

1 1 CU. YD. PAGE BUCKET. DB-20.

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

1 44½"x88½"—37 H.P.—145 lb. Working Pressure—Canadian Standard. Will fit B or B-2. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Massachusetts Standard. Will fit any B-2 or B-3 Machine. B-7.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

1 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-18.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR — GENERAL ELECTRIC—75 H.P., 2220 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC—5-KVA, 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 446 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycles, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M. — Overall dimensions:—Height 45"—Length 37½"—with 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

ROAD ROLLERS

1 10-TON BUFFALO SPRINGFIELD GASOLINE ROLLER with scarifier. About three years old. Splendid condition. Very favorable price. RR-1.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 H.P. at 450 R.P.M., 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Also auxiliary air starting equipment. DE-2.

1 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINE—4-cylinder, 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4-cycle, Vertical—valve-in-head type. DE-5.

1 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINE—3-cylinder 6" bore x 8" stroke, 60 H.P. at 650 R.P.M. DE-6.

Gasoline

1 MODEL HH-U NOVO—16 H.P. ENGINE—4-cylinder, 3⅜" x 4"—1200 R.P.M.—Radiator cooled—complete power plant—mounted on channels—sheet metal housing—extended crank shaft 1⅞" diameter, including outboard bearing with Fafner ball bearing. GE-1.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES, Model AL, Type 2. Price very favorable. L-1.

TRAILERS

1-14 TON WILLIAMS "ECONOMY" TRAILER. Arch Girder Construction—Safety Chains—Rear Loading ramp. Solid Rubber tired wheels 28"x10" front 28"x16" rear. Deck dimensions 12'x7'9"x31½" high. Brand new. T-1.

PUMPS

1 NB — 3 STAGE CENTRIFUGAL PUMP — 2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Address all inquiries to Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.

Equipment You Ought to Know About

(Continued from Page 55)

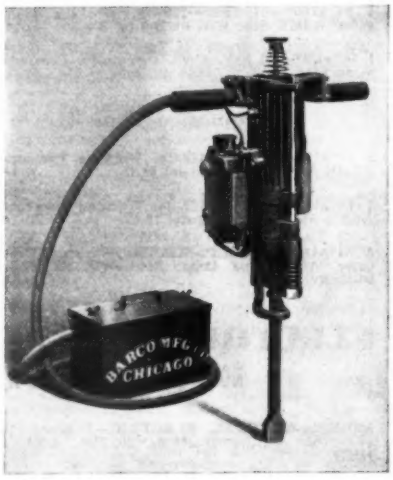
compressor is provided with all modern compressor and engine accessories such as air cleaners, and oil filters. It is available in the four sizes in greatest demand. All of them may be obtained in any kind of mounting—2 or 4 wheel—steel tires or either kind of rubber tires—or mounted on a truck.

Hercules Ironer Roll

THE HERCULES Company of Marion, Ohio, announces the Hercules Ironer Roll, an attachment for their Hercules three-wheel rollers. This ironer roll is an auxiliary roll of small diameter, mounted in place of and interchangeable with the scarifier. It is hydraulically operated, roller-bearing mounted and has great flexibility in its operation, with a range from minus 6 inches to 6½ inches above grade, and hydraulic pressure range from zero to 300 pounds. In operation, a weight corresponding to more than 50% of the total weight of the entire roller may be exerted on this auxiliary roll, and as the small diameter of the roll provides a shorter arc of contact with the material being rolled, better compaction is obtained, high spots are eliminated and uniformly level surface obtained. According to the manufacturer an important factor in the operation of this Hercules ironer roll is the positive-power-control which automatically maintains proper traction on the rear driving wheels at all times. Placing this auxiliary roll at the rear of the Hercules three-wheel roller, a perfect plane about 17 ft. long is obtained. This long plane surface successfully eliminates short waves in the road surface. A smooth level surface, free from wheel marks is obtained with a few longitudinal passes of the Hercules roller equipped with this ironer roll. Less rolling time is required to complete the job and the necessity for cross rolling is eliminated.

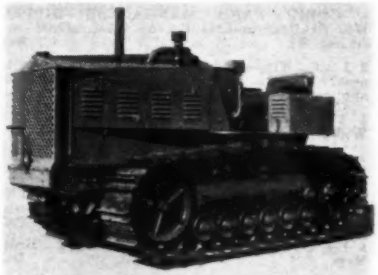
Barco Gasoline Hammer Announced

A NEW PORTABLE gasoline hammer that can be used for many demolition purposes has been announced by the Barco Manufacturing Company, 1801 Winnemac Ave., Chicago. The Barco Hammer is an air-cooled, two-cycle, single cylinder, gasoline driven device, striking 1200 to 1500 blows per minute. It is designed to hold any standard 1⅛-inch hex shank tool. According to the manufacturer, this hammer possesses the advantages of easy transportation, the heaviest type weighing only 89 pounds, and adaptability to any kind of job with low operating cost without sacrifice of power.



Cletrac 35 Diesel Announced

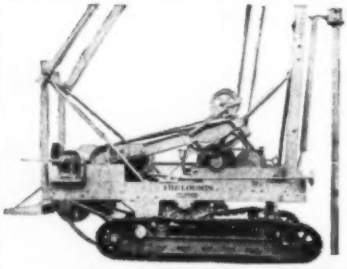
THE CLEVELAND Tractor Company of Cleveland, Ohio announces the Cletrac "35" Diesel which has a six-cylinder engine,



4¾" bore by 5¼" stroke, operating at 1200 r.p.m. and equipped with electric starter. It has seven main bearings and the crankshaft is balanced with integral weights, resulting in a well-balanced, smooth operating engine. Removable liners are provided in the cylinder block. The engine, delivering a maximum of 46 horsepower at the drawbar, is of the same general construction as the engine used in the Cletrac Diesel "80". According to the manufacturer there are embodied in the Cletrac Diesel "35" the features of the Cletrac "35" gasoline tractor which has been tried and proved by years of service in industrial work.

MILLIONS OF FEET!

Hundreds of Loomis "Clipper" Drills are still working speedily, efficiently, after drilling millions of feet.



Loomis "Clipper" Drills, sturdy, dependable, will drill a maximum of footage at a minimum cost.

Write for data.

The **LOOMIS MACHINE COMPANY**

K Street Established 1842 Tiffin, Ohio

MEETING PLACE OF CAPITAL AND LABOR

THE KOENIG LABOR AGENCIES

Established 1875

ST. LOUIS
612 Walnut Street
Main 2766 and 2767

KANSAS CITY
501 Delaware Street
Main 0796

HELP OF ALL KINDS FURNISHED FREE

Trade Notes

The Worthington Company, Inc., has recently established a Pacific Coast regional headquarters at Los Angeles, to take care of the Corporation's business in the west now carried on through the Worthington district offices in Seattle, San Francisco, Los Angeles and El Paso. C. E. Wilson, Vice President, is in charge of this Pacific Coast Division and has moved his office from New York to the new headquarters at 510 West 6th Street, Los Angeles.

Directors of **Blaw-Knox Company** recently elected Robert F. McCloskey Director and Vice-President in charge of operations of the plants located at Blawnox, Pa., to replace Wayne Rawley, deceased. Mr. McCloskey has been associated with the company since 1920, starting as manager of a plant then located at Wheatland, Pa. In 1922 he was made production manager of shops at Blawnox, and in 1931 became general superintendent.

The following changes in organization in the Explosives Department, **Hercules Powder Company**, effective January 1, 1935, have been announced by C. A. Bigelow, General Manager of the Department. John K. McCabe, formerly assistant manager of the San Francisco office, has been made an assistant director of sales with offices in Wilmington, Delaware. J. B. Johnson, for the past five years superintendent at Hercules, California, has been named to succeed Mr. McCabe as assistant manager of the San Francisco office.

C. Parker Holt was named Executive Vice-President of the **Caterpillar Tractor Co.** at a meeting of the Board of Directors held on Friday, December 7th. Thomas J. Conner was made Vice-President in Charge of Manufacturing and was elected a Director of the Company to fill the vacancy on the Board of Directors caused by the recent death of Pliny E. Holt.

The Baldwin Locomotive Works has appointed Messrs. Carr Brothers, Inc., of New York its exclusive agent for the Republic of Mexico. The sale of Baldwin products and the products of other companies which Baldwin represents in Mexico, will be handled by Carr Brothers' Mexican representative, P. G. Cheatham, Carr Brothers de Mexico, S. A., 2-A Venustiano Carranza No. 48, Mexico, D. V. (Postal Address) Apartado 106 bis.

Book Reviews

Tractors—Two new pieces of Caterpillar literature have been released. A 48-page catalog on the Diesel Fifty Tractor and a folder describing the new Tandem Diesel Auto Patrol. Write the **Caterpillar Tractor Co.** at Peoria, Illinois, for copies.

Drill Catalog—Recently issued by **Bucyrus-Erie Company** is a complete catalog on their Bucyrus-Armstrong line of drilling and fishing tools. File size, liberally illustrated, with tool data clearly presented and actual prices shown plainly on each item, the book has been carefully prepared throughout for convenience of the user. Also included are instructions for sharpening bits, tempering, splicing cables, data on casing and pipe, other hand-book material for the churn-type drill operator. Write Bucyrus-Erie Company, South Milwaukee, Wis., for your copy, mentioning this publication.

Pumps—A bulletin describing Rex speed prime pumps has recently been published by **Chain Belt Company** of Milwaukee, Wis. Tables are included to show the dewatering capacities of these pumps which are made in 2, 3, 4, and 6-inch sizes. The Rex 4" and 6" speed prime pumps are especially adaptable for well-point work. A copy may be had by writing the manufacturer.

Turbo Generators—Two new bulletins have recently been prepared for the construction industry by **The Moon Manufacturing Company**, 108 No. Jefferson St., Chicago. Bulletin No. 21 describes Type 4 and No. 22, Type C steam driven turbo generators as manufactured by this company. The bulletins give complete specifications and construction features. Copies may be had by writing the manufacturer.

Air Compressors—A 12-page bulletin, No. 3411, has recently been published by **Schramm, Inc.**, of West Chester, Pa. manufacturers of air compressors and welders. The bulletin describes fully the Schramm line of belt and motor driven compressors, giving capacities, horse-power and space requirements. A copy may be had by writing the manufacturer.

Bearings—An announcement, published in the November issue, of a new catalog issued by the **Shafer Bearing Corporation**, gave the company's address as 650 Grand Ave., Chicago. The correct address is 6501 West Grand Ave.

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

OPERATOR

Thirty years experience on coal stripping, railroad and highway construction. Prefer coal stripping anywhere. Can do own repair work and furnish best of references. Married. Present location, Pennsylvania. Box 6501.

OPERATOR

23 years' experience on practically all makes of shovels, Draglines, Clamshell and Cranes, using steam, electric, gasoline or Diesel power. Single and willing to go anywhere in U. S. or foreign countries. Can do own repair work and furnish A-1 references. Present location, Wisconsin. Box 6900.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

ENGINEER-SUPERINTENDENT WANTS CONNECTION WITH CONTRACTOR

Twenty years' exceptional experience in factory construction, rock work, roads, dams, tunnels, hydro-electric developments, foundations. Has produced results under difficult conditions and can handle large program in whole or part. Eight years Latin America. Go anywhere. Box 5102.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901.

OPERATOR-QUARRY FOREMAN

Have 25 years experience operating steam, electric and gasoline shovels and draglines on all classes of work. Can do own repair work. Also experienced quarry foreman with very best references. Married but willing to go anywhere. Present location Kentucky. Box 6200.

EXPERIENCED DRAGLINE OPERATOR

Fifteen years' experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903.

OPERATOR

15 years experience on gasoline, steam and electric machines. Bucyrus-Erie, Thew and Northwest machines. Prefer operating Bucyrus-Erie. Have worked on highway and railroad grading, quarry, excavation. Willing to go anywhere in U. S. A. Can do all repairing and furnish excellent references. Box 7001.

STEAM SHOVEL OPERATOR

14 years experience on Steam shovels and draglines, on highway construction, rock, quarry, gravel pit, also five years as shovel foreman in coal stripping. Can do own repair work on any type steam machine and willing to go anywhere in U.S.A. Present location, Tennessee. Box 7000.

GAS OR STEAM SHOVEL OPERATOR

7 years' experience on cutting slopes, gradings and highway construction, not afraid of work. Would like a position on any type of small machine anywhere in the U.S.A. Can do his own repair work and furnish good references. Box 6500.

STEAM SHOVEL OPERATOR

14 years experience with steam machines only on Railroad and Highway grading, coal stripping, Rock Quarry and Gravel Pits. Can do own repair work, furnish references and willing to go anywhere. Present location, Tennessee. Box 6700.

Building the Bonnet Carre Spillway Bridge

(Continued from Page 25)

● *Jordan spreader plow behind a train of Western 20-yard air dumps on one of the railway fills for Gifford-Hill.*

chine has given good service on this operation, with no delays due to mechanical failures. On the dump, the track was carried at one side of the fill on ground level. A Jordan spreader pushed the dirt back as it was dumped and it was then stacked in place by the 3-yard Bucyrus-Monighan mentioned in connection with the highway job. Later a Bucyrus-Erie 45-B took over the work of stacking the dumped dirt when the Bucyrus-Monighan Walker was moved into the borrow pit on the highway job.

The Gifford-Hill contract for fill on the L. & A. requires 130,000 yards. This fill adjoins that on the Y. & M. V., and the material is furnished from the same borrow pit, handled by the same equipment and organization. The gang just moved over their dump track to the adjoining location when they finished up the Y. & M. V. work and went right on piling up dirt.

Comfortable Camp

A modern camp city was established to serve all of the jobs with water and electric lights and about every convenience and comfort that a group of men could find in a dirt moving camp anywhere. The camp was kept up in nice shape and good food, cleanliness and sanitation were given careful attention. Special precautions were taken throughout all of the work to insure safe operation, and the entire job is, at this writing, practically complete without a single serious accident.

The Gifford-Hill personnel in charge of the highway approach work includes Howard Wilson, General Superintendent; Homer Ford, Assistant Superintendent; Leslie Lowry, Foreman on the south approach; Don Barry, Night Foreman on the north approach; Stewart Wooten, Night Foreman on the south approach; Joe Greer, Master Mechanic; Jerry Higgs, Engineer; and George E. Rogers, Assistant Engineer. The Louisiana Highway Department is represented by Engineer D. F. Simmons, while U. S. Engineer E. L. Nathan looks after the interest of the government on the highway as well as on the railroad projects.

On the Gifford-Hill railroad work, Oscar Shull is Superintendent with C. J. Sawyer as Foreman.

The highway approach operations were handled on four 5-hour shifts working six days per week. Bridge fills ran two 7-hour shifts.

● *Before walking over to clean up the loading for the highway fill the Bucyrus-Monighan gave the boys a lift with the trimming and sloping on the Y&MV approach. Notice the nice little box she's in, between poles and under the power line. But that's no trick for a walker. . . . She steps off in any direction you point her. The footing here isn't much to brag about either — but traveling over soft ground is another of the Walker's specialties.*

Denver Creates Cherry Creek Flood Control District

A FLOOD CONTROL project in Denver designed to control the menace of flash floods originating in the Cherry Creek watershed advanced another step toward the construction stage when city officials recently took legal steps to create the local Cherry Creek Flood Control Improvement District. Property owners are given until Feb. 6 to register protests, after which the city manager of improvements and parks will order the work started. It is expected that bids will be asked in about three months.

The work will consist of building an earth-fill dam across Cherry Creek about 6 miles southeast of the city. The cost of the dam is estimated at about $800,000, and 35 per cent of this cost will be financed by general city and county obligation bonds. An issue of $295,000 of these bonds has already been approved by the voters, and $118,000 were sold several weeks ago to cover preliminary engineering costs. The PWA offered to take these bonds at 4 per cent interest, but later granted permission for a public sale to permit the city to obtain a lower interest rate.

Construction of retaining walls within the city to provide a definite channel for Cherry Creek is already under way as a separate project. Ordinarily the stream is small, but it occasionally has severe flash floods as the result of a large catchment area which is subject to severe local cloudbursts.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT

FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Monighan Dragline 60-foot boom. Priced right.
- ☐ Thew Model 85, ½ yd. Sh. Crane, S. Scoop & Trench Digger.
- ☐ Northwest 45' Boom Clamshell — 1 yd. capacity.
- ☐ Mead - Morrison Gasoline Combination Shovel-Clamshell. Good condition.
- ☐ P&H Model 207—40' Boom Dragline. Reconditioned.
- ☐ Bucyrus-Erie GA-2 Shovel. Rebuilt. New Machine Guarantee.

Name.....

Address.....

THEW-LORAIN 75-A. 1¼ CU. YD. GASOLINE SHOVEL. Fair condition. Very favorable price. Located North Carolina. Box 553-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel—Recently overhauled — Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd. Gasoline Shovel—Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

BUCYRUS-ERIE GA-2 SHOVEL—24' BOOM, 16' DIPPER HANDLE, 1¾ CU. YD. DIPPER. Battery Lighting System. Late style Cat mounting. Excellent condition. Located West Virginia. Favorable price. Box 541-SS.

BYERS MODEL 40—⅝ cu. yd. Cable Crowd Shovel, Outside Dipper Handle, Plate Dipper. ¾ swing. Including Back Hoe Attachment. Hercules 4-cylinder Gasoline Engine. Cat mounted—12" treads. Located eastern Pennsylvania. Box 554-SS.

BUCYRUS-ERIE—42-B Steam Shovel, Caterpillar Mounted, 21' Boom, 15' Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. 531-SS.

If You Do Not Find What You Want Listed—Write Us

The Excavating Engineer

South Milwaukee, Wis.

REBUILT GA-2 SHOVEL NO. 10817, single shaft cat mtd., 24' boom, 16' dipper handle, 1¼ cubic-yard cast front inserted tooth dipper, electric starter, Waukesha 4 cylinder 6¼"x8" Gasoline Engine, steel cab. New machine guarantee. Box 567-SS.

FIELD RECONDITIONED GA-3 NO. 11285, single shaft cat. mtd. 22'6" boom, 16'0" dipper handle, 1¼ cubic-yard inserted tooth dipper, electric starter, Kohler 1½ K.W. light plant with two floodlights, Wisconsin 6-Cyl. 5¼" x 6½" engine, steel cab, excellent condition. Box 568-SS.

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

THEW-LORAIN 75-B 1¼ CU. YD. gasoline shovel. AA-1 condition. Located Texas. Box No. 565-SS.

MEAD-MORRISON COMBINATION SHOVEL-CLAMSHELL—½ cu. yd. Dipper, 17' Dipper Handle, 18' Boom—32' Boom Clamshell Equipment and ½ cu. yd. Erie Clamshell Bucket, Wisconsin 4-cyl. 5"x6" Gasoline Engine. Good operating condition. Located near Buffalo, New York. Box 527-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22'6" boom — 16' dipper handle—1½ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼"x8" engine—New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 23' boom — 17' dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinity New York. No. 512-SS.

BUCYRUS-ERIE FIELD RECONDITIONED D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four-cylinder 6½"x8½" Engine. Excellent condition. Box 428-SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433-SS.

Type "B" Caterpillar mounted, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24' boom—18' 4" dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition. Located near Hartford, Conn. Box 523-SS.

BUCYRUS-ERIE—MODEL 1025—⅝ yd. Gasoline Shovel. Good condition. Located in California. Box 479-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located near Baton Rouge, Louisiana. 537-SS.

BUCYRUS-ERIE B-2—Late Model High Lift, Single Shaft Cat Mounted, Steam Shovel. Excellent condition. Located vicinity Boston. To be demonstrated. 538-SS.

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

Drag Shovel

Thew—Universal—Model 35—½-cu. yd. drag shovel complete. Center drive cat. Electric starter. 4 cylinder Waukesha 4½" x 6¼" gasoline engine. Also complete ½-yd. shovel equipment and 25' boom clamshell—crane equipment and bucket together with home-made trailer. Box 468-SS.

1 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

BUCYRUS-ERIE MODEL 1025 GASOLINE COMBINATION ⅝-YARD SHOVEL — 35' Clamshell, including ⅝-yard Williams Clamshell Bucket. Located near Oshkosh, Wisconsin. Good condition. Box No. 504-SS.

HEAVY DUTY OSGOOD SHOVEL, Shop No. between 1600 and 1700, located near Scranton, Pa., equipped with a 1½ cubic yard dipper, in good operating condition. Price $3000.00. Boiler inspected January 1st, 1934. Box 473-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL; 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model. 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 536-SS.

BUCYRUS-ERIE MODEL 1035—Gasoline, Chain Crowd Shovel, Single Shaft Cat, 26" Treads, Electric Starter, ⅞ Cu. Yd. Dipper. Now operating. Can be demonstrated, Located Massachusetts. 535-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

BAY CITY MODEL K GASOLINE SHOVEL —17' Boom, 11' Dipper Handle, ½ cubic yard Dipper, 50 HP Hercules Gasoline Engine. Machine rebuilt in 1932 and equipped with positive "Snap In" type propelling clutches and other features of Model K-2 type. Located central New York. Priced for quick sale. Box 513-SS.

NORTHWEST MODEL 6—1½-YARD SHOVEL, Twin City 4-cylinder 7¼"x9" engine. Close Crowd. New 1931. Located near Philadelphia. Box No. 503-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

GENERAL ½-yard Gasoline Shovel—New 1931. Powered with Buda DW6 Gasoline Engine. Machine well taken care of. Excellent condition and appearance. Located Denver. Price favorable. 588-SS.

BUCYRUS-ERIE Gas-Air — GA-3 High Lift Shovel—1¼ cu. yd.—Single Shaft Cat Mounted. 120 H.P. Waukesha Engine with high compression head. Machine excellent mechanical condition. Guaranteed by owner. Located Montana. 589-SS.

BYERS MASTER SHOVEL — 26' Boom, 17' Dipper Handle, 1¼ cu. yd. Dipper, New January 1931. Good working condition. Located Carthage, Missouri. 591-SS.

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24' Boom, 18'4" Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

THEW "00" ⅝ cu. yd. Shovel. Center drive cat. Wood cab armored. Full revolving 4-cylinder Waukesha Gasoline Engine. Recently overhauled. Located eastern Pennsylvania. 585-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼"x8" Gasoline Engine. Reported excellent condition. Located West Virginia. 593-SS.

BUCYRUS-ERIE 1030 GAS, ROPE CROWD SHOVEL. Good operating condition. Located eastern Minnesota. Available for demonstration. Price right for quick sale. Box No. 490-SS.

BUCYRUS-ERIE 35-B ELECTRIC 24' BOOM, 16' Dipper Handle, ½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BAY CITY ½ CU. YD. GASOLINE CAT MOUNTED SHOVEL. Good condition. Located Massachusetts. Low price. Box 550-SS.

NORTHWEST MODEL 6—1½ CU. YD. SHOVEL—22' Boom, 19' Dipper Handle, Caterpillar Diesel Model D-11000 6-cyl. Engine. Rebuilt early this year. Excellent condition. Located eastern Pennsylvania. Box 547-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1⅛ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

KOEHRING MODEL 501 SHOVEL—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Cable Crowd. 4-cyl. Wisconsin Gasoline Engine. Electric Starter. Automatic Trip. Chain Drive Cat. Excellent condition. Located near New York City. Box 552-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES, good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each. Box 540-SS.

BUCYRUS-ERIE DIESEL-AIR COMB, Shovel-dragline—22'6" shovel boom, 14' dipper handle, 1½ cu. yd. inserted tooth dipper. 40' dragline boom plus 10' extension and 1¼ cu. yd. Page "M" drag bucket. Also Kohler 1500 watt light plant installed. Atlas 4-cylinder 6½x8½ Diesel engine. Machine undergoing field reconditioning. Will be excellent condition. Located Arizona. Box No. 562-SS.

MARION 36 STEAM SHOVEL, full revolving, mounted on Cats., 32 foot boom, 20 foot dipper stick, 1 yard dipper, rebuilt and in excellent condition. Located in Central Michigan.

MARION 31 STEAM SHOVEL, mounted on Cats., 1 yard dipper, extra 40 foot boom and drum. Overhauled and in good condition. Located Northeastern Indiana.

BYERS STEAM CLAMSHELL ON CATS., 35 foot boom, ¾ yd. clam bucket. Could be used as source for spare parts. Bargain price. Located in Northern Pennsylvania. Box 583-SS.

NORTHWEST Gasoline Shovel—New 1932—1¾ cu. yd. Esco Dipper, 24' Boom, 17'6" Dipper Handle, Close Quarter Crowd, Positive Traction Brake, Twin City 4-cylinder 7¾"x9" Gasoline Engine. Excellent operating condition. Located California. 586-SS.

3 OSGOOD "CONQUERORS"—All new 1929. Two equipped 20 Boom, 15' Dipper Handle, 1¼ cu. yd. Esco Dippers, Waukesha 100 H.P. Gasoline Engines. Third Machine—40' Boom Dragline with 1 yard Page Bucket and LeRoi Gasoline Engine. All located California. Mechanical condition excellent. Prices favorable. 587-SS.

MARION 1 YARD STEAM SHOVEL Box 575-SS.

LIMA 101 GASOLINE 1¼ YARD SHOVEL. Located eastern Pennsylvania. Good operating condition. Price reasonable. Box 576-SS.

MARION MODEL 450—1¼ YARD SHOVEL. AC-DC power. For 60 cycle, 3 phase, 440 volt current. Located eastern Pennsylvania. Price reasonable. Box 577-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35' Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40' Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

2 INSLEY ⅝ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

Small Draglines
Under 2 Yards

NORTHWEST MODEL NO. 7—40' boom dragline and 1⅜ cu. yd. Omaha drag bucket. Powered with Twin City 4-cylinder 7¾"x9" gasoline engine. Caterpillars 24" treads x 14' long. Located in Louisiana. Box No. 560-SD.

P. & H. MODEL 208 NO. 1452—45'-0" Boom Dragline and 1½-cu. yd. Omaha Bucket. Engine 4-cyl. 7¾" x 9" Twin City Gasoline. Located in Nebraska. Bargain price. Box 571-SD.

P. & H. 208 NO. 2035—45' boom dragline (no bucket)—100 HP Waukesha High Altitude Engine, no starter, Cat. Mtd. 15½' long, 9' overall width, treads 22". Located Denver. Priced for quick sale. Box 570-SD.

MONIGHAN DRAGLINE. Shop No. 203, 60'0" boom, 1¼-cu. yd. Page dragline bucket. Rebuilt 1927 and equipped with 1-W type walking device and Waukesha 5¾" x 8" WS 4-cyl. engine. Machine reported excellent operating condition. Will consider any reasonable offer. Box 569-SD.

P & H MODEL 700 DRAGLINE—equipped with a 50 foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700—equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

NORTHWEST—MODEL No. 4—50' boom dragline including drop ball for rock breaking. Cat mounted. 4 cylinder 6 x 7 Wisconsin gasoline engine. Excellent operating condition. Located vicinity New York. Box 470-SD.

MONIGHAN BRAND NEW—40' Boom Dragline. Cat mounted, Waukesha four-cylinder 6½"x7" Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 463-SD.

NORTHWEST MODEL 102—36' BOOM COMBINATION CLAMSHELL-DRAGLINE including ½ yard drag and clamshell buckets. Good operating condition. Located near Chicago. Very reasonable price. Box 581-SD.

P&H MODEL 775—70' BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

BUCYRUS-ERIE 1030 Gasoline Combination Dragline-Clamshell. Located Texas. Box 580-SD.

2 NORTHWEST MODEL 104 Gasoline 40' Boom Draglines. Box 515-SD.

BUCYRUS-ERIE 30-B Diesel 40' Boom Dragline. Box 437SD.

NORTHWEST MODEL NO. 6—40' boom dragline and 1⅜ cu. yd. Northwest drag bucket. Twin City 4 cylinder 7¾x9 gasoline engine with fuelizer. Caterpillars 33" treads x 12'6" long. First class condition. Located Louisiana. Box No. 559-SD.

Small Clamshells and Cranes
Under 2 Yards

NORTHWEST — MODEL 105 — 45' BOOM CRANE. Cat mounted. 1 yd. capacity. 6¼x8 Twin City gasoline engine. Good operating condition. Located vicinity New York. Box 469-SCC.

2 MARION No. 7 Convertible Steam Cranes—50' Boom. Cat Mounted. Also convertible to ¾ yard Shovel. Prices favorable. Located Philadelphia. 590-SCC.

BUCYRUS-ERIE 1030 GASOLINE 40' BOOM CLAMSHELL MACHINE. Cat mounted. No Bucket. Recently overhauled. Guaranteed. Located Kansas City. Box 543-SCC.

NORTHWEST MODEL 105 Gasoline—40' boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

THEW-UNIVERSAL 35 CRANE on center drive cats, 36' Boom, fairleads, ½ yd. dragline bucket, 3000 lb. hammer, leads and cap. Excellent condition, sale or rent. Located Western Ohio. Box 457-SCC.

BYERS BEARCAT 25' BOOM CLAMSHELL. (⅝ swing) and ½ cu. yd. Clamshell Bucket, including Trench digging attachment carrying ½ cu. yd. dipper. 24" wide over cutters—will dig maximum 15'. Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

CRANE—THEW—UNIVERSAL—MODEL 35—25' boom clamshell—crane including ½ cu. yd. Williams clamshell bucket—center drive cat. Electric starter, 4 cylinder Waukesha 4½"x 6¼" gasoline engine. Also, complete ½ yd. shovel equipment, drag shovel equipment and skimmer scoop equipment together with home-made trailer. Box 468-SCC.

Large Shovels and Draglines
2 Yards and Over

IN SOUTH CAROLINA near Marietta, 70-C STEAM SHOVEL.
IN KENTUCKY near Nonnell, 225-B STEAM SHOVEL.
Bargains as source of spare parts. Box 558-LSD

FOR SALE
CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.
ALSO
2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap. Box 419-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Large Shovels and Draglines
2 Yards and Over
Continued

70-TON STEAM SHOVEL mounted on "cats." Caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

50-B BUCYRUS-ERIE ELECTRIC CRANE with 75 ft. boom. Can be inspected in operation. Not far from Kansas City. Box 474-LSD.

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment—in first-class condition. Located in northern Missouri. Box 452-LSD.

85-C STEAM SHOVEL, on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Hazelton, Pa. Box 163-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator Number 3327 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Price very reasonable. Located at Turkey Creek, La. Box 111-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3¼-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

50-B STEAM BUCYRUS-ERIE
COMBINATION SHOVEL AND DRAGLINE

26' Boom	1 KW 32 Volt Moon Electric Light Plant
17' Dipper Handle	
2 yard Dipper	Boiler—Standard coal burning locomotive type 54"x9'7"
50' Boom Dragline Equipment	

1¾ cubic yard Page Bucket

INCLUDING

2 steel under-frame flat cars on which machine now loaded. New 1929. Shop No. 10557. Moved only 200,000 yards material. Excellent condition. Deal direct with owner.

PRICE VERY ATTRACTIVE

Box No. 465 LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable, reel and approximately 1400 feet of cable all in excellent condition. Reasonable price. Address Box 268-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper. Chicago territory. Box 347-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

FOR SALE OR EXCHANGE

One Bucyrus 2½ yd. dipper, track shovel. Would consider late model tractor. Box 572-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator. Number 3402, 70-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Priced very reasonable. Located at Grand Prairie, Texas. Box 110-LSD.

Dump Cars

WANTED
20 Good used, Sanford-Day, Drop-Bottom Mine Cars, 42" gage, 3 or 4 ton capacity. 539-ME.

3 15-TON SANFORD-DAY DROP BOTTOM CARS, 36" gauge, link couplers.
6 40-TON SANFORD-DAY BROP BOTTOM CARS, without air brakes, standard railroad couplers, standard gauge.
2 12-YARD WESTERN, 2 WAY DUMP CARS, standard gauge.
3 6-YARD WESTERN, 2 WAY DUMP CARS, 36" gauge.
Box 100-DC.

Locomotives

For Sale or Rent

Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-Ton, 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

1 18-TON VULCAN LOCOMOTIVE No. 387, 10x16 cyl., 36" gauge.
1 40-TON VULCAN LOCOMOTIVE No. 3295, 14.22 cylinders, link valve motion, standard gauge.
1 40-TON DAVENPORT LOCOMOTIVE No. 2189, new May 1931, 14x20 cylinders, link valve motion, standard gauge.
Box 100 Loco.

LOCOMOTIVES

6 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

Miscellaneous Equipment

Bargain Parts for Bucyrus 70-C Steam Shovel

6—Pcs. 1¼" 6x19 Plow Steel swinging cable in the following lengths: 1 pc. 48'4"; 2 pcs. 50'0"; 2 pcs. 53'0" and 1 pc. 54'0".
13—Dipper teeth—special—will fit bases included below.
5—Dipper tooth bases — to take above teeth.
3—Dipper tooth bases — extra heavy, to take above teeth.
3—Shackles No. 9161—1½" stock (Swinging circle).
1—Propelling gear No. 10495-A, Weight 198 lbs. (Hoisting gear).
2—Rack pinions No. 24420-A (Boom).
5—2½" U Bolts, 9¾"x34"— (Saddle Block).
1—2" U. Bolt, 9¾"x34"—(Saddle Block).
2—1½" Turnbuckles.
3—Back braces No. 1—16431 (Dipper).
4—Boom turnbuckle braces, 1 ft.
4—Bell cranks for hoist spindle No. 6—9133 (Hoisting gear).
2—Friction bands, lowering—(one complete with wood blocks — other half).
1—1" Cast-iron boom plate washer, 28" dia. with 17½" dia. center hole. Box 529-ME

The Bargain of the Year

ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

54 Steel bunks with mattresses and bedding. Mattresses and bedding are sewed up in burlap.
6 Heating stoves.
50 Shovels and picks, approximate.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
2 Fairbanks Morse gasoline engine and 3x5 bulldozer pump 1½ HP.
4 Track jacks, 15 ton.
3 Track jacks, light.
1 Duplex Pump—Worthington, 5¼x3-½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
2 Each, scythes, hand saws, cant hooks, spike malls.
1 Carbide light.
1 Kitchen outfit.
1 Set boiler tubes for steam shovel.
30 Western dump cars, 5-yard.
1 36x84" vertical boiler.
1 6" centrifugal pump with upright engine attached.
2 Galvanized water tanks, wagon size.
100 Timbers, 10x12x16'.
12 Timbers, 10x12x32'.
About 800 pieces of pipe, size 1½ and 2", random lengths.
1 26' Bare Boom, 1 17' Handle, 1 1¾ yd. dipper for 50-B Steam Shovel.

Will consider individual sale of separate items.

Address Box 449 ME.

EXCAVATING ENGINEER
So. Milwaukee, Wis.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

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Offered for sale by Southern contractors. Priced to sell.
7—Railroad Type Steam Shovels 2½ to 5 yd.
3—Full Revolving Shovels, ¾ yd.
1—Gasoline Clamshell Crane ½ yd.
2—Jordan Spreaders.
2—Locomotives, 26 Ton, American Saddle Tank.
32—12-yd. Western Heavy Duty Dump Cars.
3—Camp Cars.
1—Flat Car.
2—1-bag Gasoline Concrete Mixers.
Pumps, Boilers, Jacks and Other Tools.
For further particulars, Address Box 138-ME.

FOR SALE

ONE TWO DRUM THOMAS HOIST—Silent chain drive—150 HP. electric motor, 3 PH. 60 Cy. 440 V. including approximately 1300 ft. cable and 3 cu. yd. Green Scraper serial No. 607. A-1 condition. Located near Mason City, Iowa. Deal direct with owner. Box 471-ME

4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $175.00 each. Chicago territory. Box 349-ME.

COMPLETE EQUIPMENT for 2 strip mines, contractors or quarry operations. No. 300 and No. 36 Marion steam shovels, well drills, locomotives, cars, crushers, picking tables, loading booms, cable and button retarders, compressors, motors, transformers, flood and search lights, camp equipment and new repair parts for above. Box 195-ME.

FOR SALE OR EXCHANGE

14, 1½ yard Western Dumpwagons. Would consider Best Tractor, late model in exchange. Box 572-ME.

SHOVEL FRONT END for Bucyrus-Erie B-2 steam machine consisting of 19'9" new style heavy boom, 16' new style heavy dipper handle, and ¾ yard C.F.I.T. dipper. Box 584-SFE.

GASOLINE BLAST HOLE DRILL—self-propelling type—27' derrick for manila rope, complete with tools and cables for drilling 4½" and 5⅝" blast holes or water wells. Located Ohio. Immediately available, subject prior sale. Attractive price. Box 582-BHD.

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For inquiry on supplies and equipment not advertised another postal card addressed to us is provided. Check plainly *only* those items in which you are interested. *Excavating Engineer* will be pleased to serve you in forwarding your inquiry to manufacturers.

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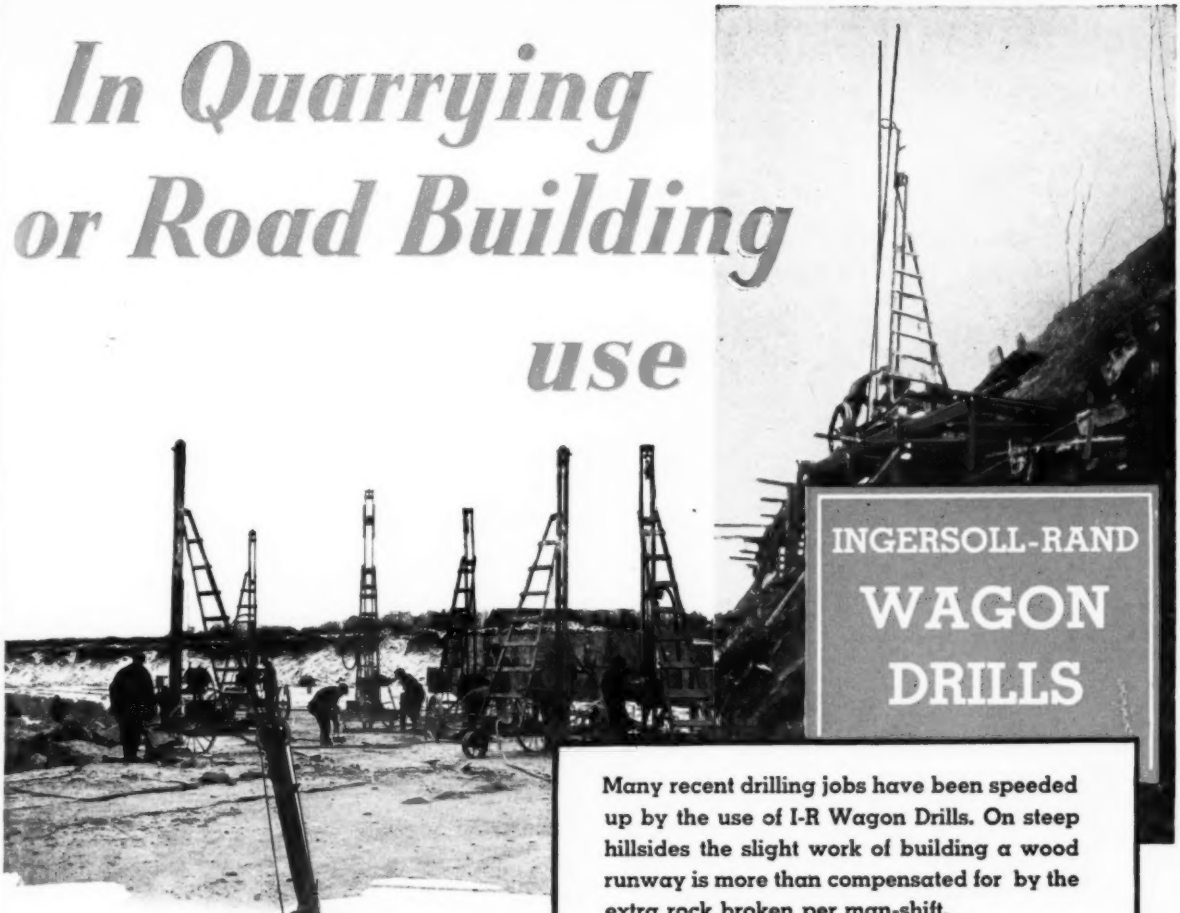

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